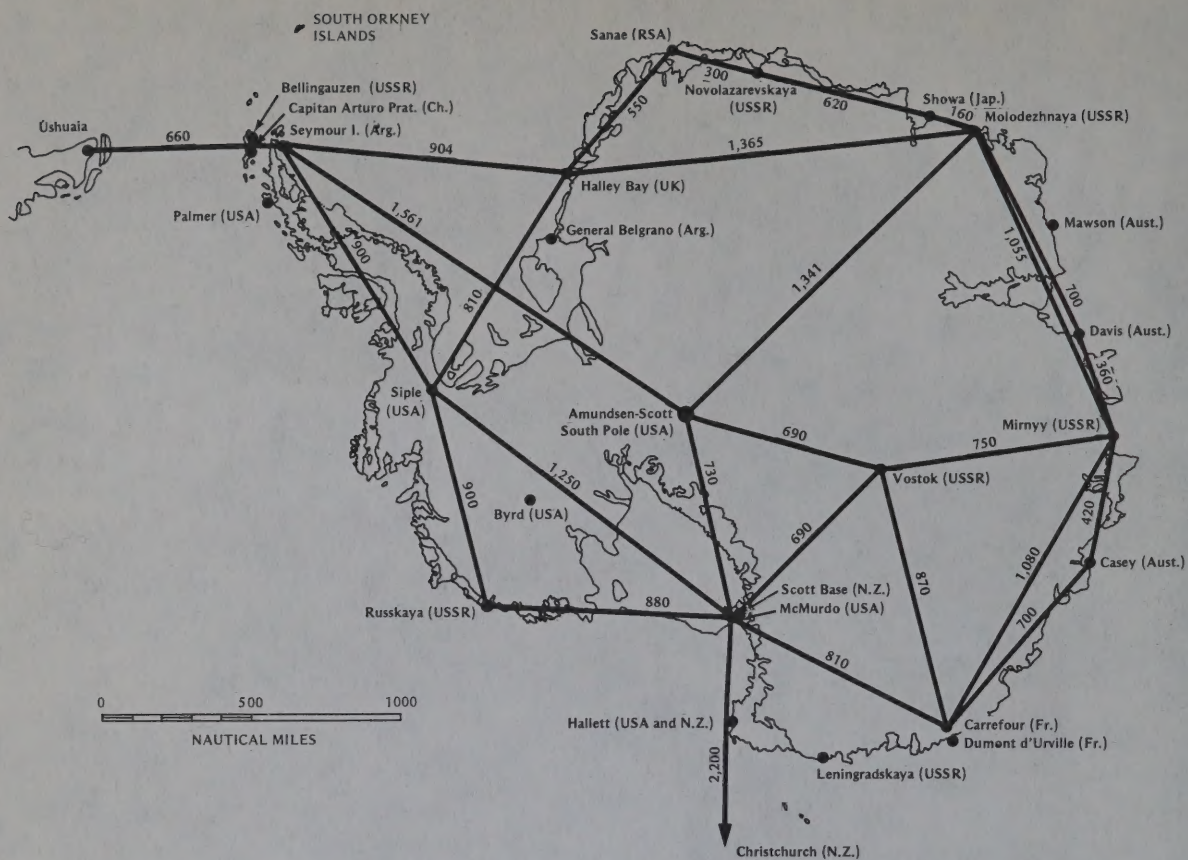


THE POLAR TIMES





Map of Antarctica showing air distances between selected stations.



There really is a South Pole—surrounded here by the flags of Antarctic treaty signer nations.

The Polar Times

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No. 76

JUNE 1973

Russians Will Help U.S. In Drilling in Sea's Floor

By WALTER SULLIVAN

The New York Times

March 23

The Soviet Union has agreed to help guide and finance the scientifically fruitful Deep Sea Drilling Project of the United States, contributing \$1-million annually, or about one-tenth of its cost.

It is believed to be the first time another country has entered into such an arrangement with the United States. Final agreement came this week after the project's drill ship, the *Glomar Challenger*, reached Christchurch, New Zealand, with a new cargo of scientific discoveries from Antarctic waters.

These, as described at a news conference here yesterday, included the existence of natural gas in the floor of the Ross Sea and evidence that the Antarctic ice sheet, which now makes up more than 90 per cent of the world's ice, first formed 20 million years ago, some 15 million years earlier than had generally been believed.

The drilling of 16 holes in the ocean floor also showed evidence that five million years ago the bottom was scraped by an ice sheet that once extended 200 to 300 miles farther out into the Ross Sea than at present.

In contrast to the Ross Ice Shelf, an apron of continental ice, some 600 feet thick, that floats on the southern part of the Ross Sea, this former blanket of ice was far thicker, plowing across a sea floor that is from 1,500 to 2,000 feet below sea level.

The *Glomar Challenger* is the only ship that has ever been able to drill through the sediments of the deep sea and sample the bedrock under them, often beneath water more than three miles deep. The resulting discoveries have vastly increased knowledge of the history of the ocean basins, their

past climate and their inhabitants.

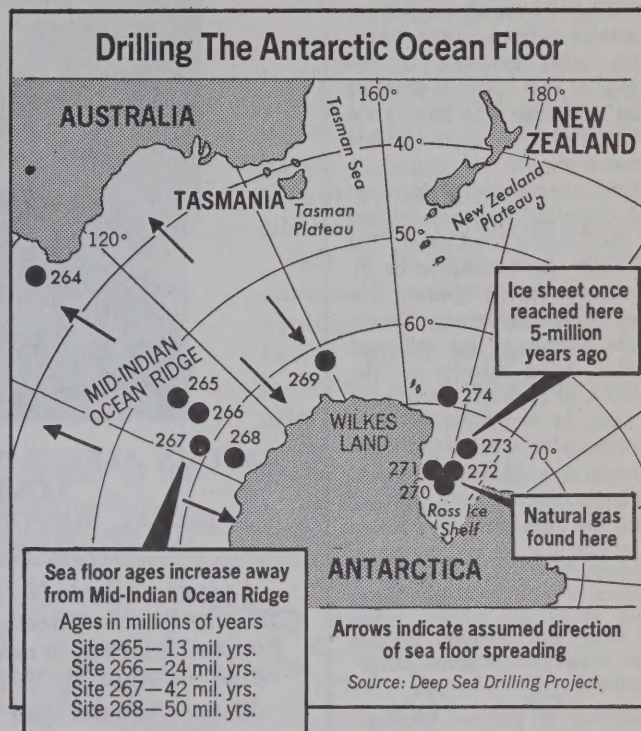
The drill sites have been numbered consecutively, those of this portion of the project being numbers 264 through 274. It was the 28th segment of the ship's global operations. Beginning with the sixth, from Honolulu to Guam in 1969, Russians have occasionally taken part as visiting scientists.

So have specialists from other countries, particularly those near the drilling areas. The Black Sea and the Baltic Sea, two regions of interest that border the Soviet Union, have been more or less out of bounds so far, but this may change with the new Soviet participation.

To date, policy for the project has been set by a consortium of five institutions on the East and West Coasts, known as JOIDES (for Joint Oceanographic Institutions for Deep Earth Sampling). The Institute of Oceanology of the Soviet Academy of Sciences will now become a sixth member of this group.

Direct administration of the project is under the Scripps Institution of Oceanography at La Jolla, Calif.

Entry of the Soviet Union is



The New York Times/March 23, 1973

The drilling of holes deep into the sea floor off Antarctica by the ship *Glomar Challenger* has shown the ice sheet on that continent to have once been far larger than today, and has confirmed that spreading of the sea floor is pushing Australia and Antarctica apart. The drill sites have been numbered consecutively since the project began five years ago.

an outcome of the Soviet-American agreement on cooperation in science and technology signed last May 24. In October

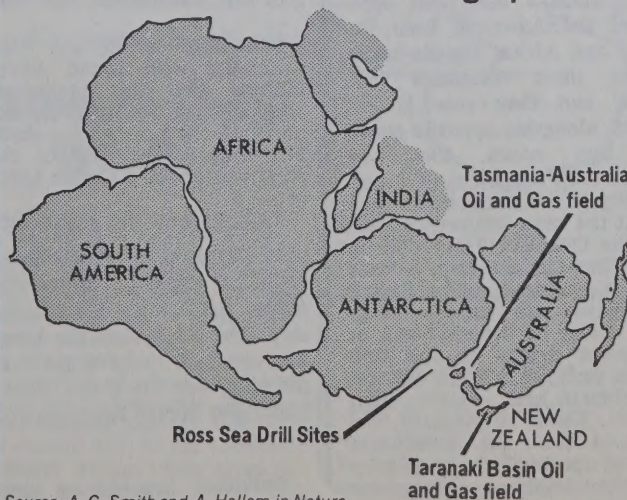
Daniel Hunt and Dr. William E. Benson of the National Science Foundation and Arthur Maxwell, provost of the Woods Hole Oceanographic Institution, met in Moscow with Soviet scientists.

It was there that details of Soviet participation in the drilling project were worked out. From Monday through Wednesday this week the American-Soviet Joint Commission on Scientific and Technical Cooperation met in Washington and gave final approval to the arrangement.

Also agreed upon were joint projects in such research areas as pollution control and water resource management. The drilling project has been approved to 1975, and the agreement provides for Soviet participation if the project is continued.

It is hoped, if funds can be obtained, to modify the *Glomar Challenger*, or another drill ship, to penetrate considerably deeper into the rock crust beneath the sea. This may become feasible if more countries join in. West Germany,

Gondwanaland—The Southern Continents Before Drifting Apart



in recent weeks, has indicated an interest in becoming a member of the team.

Among the earliest holes drilled after the ship left Fremantle, Australia, on Dec. 20 were four at sites between the Antarctic coast and the ridge, bisecting the sea that separates Australia from Antarctica. From other evidence it was suspected that material erupting from this ridge was driving the two continents apart, a few inches a year.

Evidence supporting this view was extracted from the bottom by the Glomar Challenger. The sea floor was found to be increasingly old at greater distances from the ridge. Fossils at the bottom of the sediment blanket, lying directly on the bedrock, at each site, were used to date its formation.

In the hole nearest the ridge the age was 13 million years. At holes successively farther south the ages were 24 million, 42 million and 50 million years, respectively. It is believed that Antarctica and Australia split apart about 55 million years ago with the breakup of the great southern continent, Gondwanaland.

Bubbles of gas — methane and, in some cases, ethane — were found in sediment hauled up at sites 271, 272 and 273, not many miles from the towering white cliffs of the Ross Ice Shelf. The operational doctrine of the project calls for an immediate halt to drilling whenever gas is detected lest the drill strike a high-pressure oil reservoir and produce a polluting blow-out.

At the news conference, Dr. Dennis E. Hayes of Columbia University's Lamont-Doherty Geological Observatory said that the existence of an important oil or gas reservoir there could not be ascertained under such circumstances.

However, he pointed out that, before the breakup of Gond-



**CAPTAIN ALFRED N. FOWLER, U. S. NAVY
COMMANDER
U. S. NAVAL SUPPORT FORCE, ANTARCTICA
TASK FORCE 43**

Captain Alfred N. Fowler succeeded Captain Eugene W. Van Reeth as Commander, Antarctic Support Activities, in ceremonies at Davisville, Rhode Island, on April 14, 1972.

Captain Fowler had been Chief of Operation, Team Two, at the Alternate National Military Command Center (JCS) at Fort Ritchie, Maryland. He is a graduate of Parks College, Saint Louis University, the Naval War College, and the Air War College, and he holds a master of arts degree in international relations from George Washington University, Washington, D.C.

wanaland, this region lay close to known reservoirs of oil and gas in New Zealand and beneath the sea between Australia and Tasmania.

There is evidence that, when the Atlantic first began forming, oil was laid down in narrow, shallow seas that separated the Americas from Europe and Africa. As the ocean grew, these reservoirs were split, and they now lie far apart, alongside opposite coasts of that ocean. The new discoveries suggest such a possibility in the Antarctic as well.

At the news conference, held at the Overseas Press Club in the Time-Life Building, Avenue of the Americas at 51st Street, Dr. Hayes said that the changing nature of the sediment, at different depths in the drill-holes, testified to major changes in climate and oceanic circulation. These, presumably, developed as the continents moved apart and the geography of the Southern Hemisphere changed.

this area, was laid down when the rock was at the surface, more than 20 million years ago. The sediment layers above it testified to slow subsidence of the rock, presumably as the increasing load of Antarctic ice down-warped the earth's crust.

Dr. Hayes, with Dr. Lawrence A. Frakes of Florida State University, was co-chief scientist on this segment of the project.

He believes the initial growth of the ice sheet created a great flow of icy water across the floors of the world oceans.

This, he said, could have swept away the top layers of sediment at that time, explaining the lack of a fossil record for the period from 20 million to 50 million years ago that was found at some drill sites in other ocean areas.

The findings seem to rule out the hypothesis of some students

of ancient maps that Antarctica was all or largely free of ice early in human history. Much has been made, in this respect, of a map said to date from 1513 and attributed to the Turkish admiral Piri Re'is. It purportedly shows Antarctica as it would appear if its heavy blanket of ice was largely removed.

The indications from the drill cores, as well as from shallow ones obtained by driving a tube down into the sediment, are that there has been no major retreat of the ice for many millions of years.

The great growth of the polar ice sheet, some five million years ago, must have come about from greatly increased snowfall on the Antarctic, where precipitation today is meager. Signs that the sea floor had been scraped by such an ice sheet were found at all four drill sites in the Ross Sea.

Soundings of the sea floor sediments with sound waves indicate that this planed-off layer extends 200 to 300 miles north of the present ice shelf. The nearest drill site to the shelf was about 50 miles north of it.

Twice, when the ship's drill pipe was deep in the sea floor, making it immobile, an iceber& moved menacingly toward the ship. The largest of the bergs was about 10 times larger than the ship, but the Coast Guard icebreaker Burton Island pushed it away.

Sediment, brought up from directly above basement rock in

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AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are one dollar a year, which entitles members to receive THE POLAR TIMES twice a year.

Back issues are 50 cents each.

Poulter Honored By Polar Society

Stanford Research Institute

Thomas C. Poulter, SRI's senior staff advisor, received honorary membership in the American Polar Society on Feb. 7, in recognition of his life-long contributions to polar exploration and study.

Poulter, who also serves as senior vice president for the 2500-member Society, is the eleventh person to be so honored since the organization was founded in 1934. Others include Louise A. Boyd, who financed and led eight Arctic expeditions; Capt. Finn Ronne, who discovered the world's last coastline in Antarctica; and Admiral Richard Byrd, the famed polar explorer.

Dr. Poulter was second in command and senior scientist of Admiral Byrd's second Antarctic expedition (1933-1935). During that time he used explo-



Dr. Tom Poulter greets one of his "biological subjects."

sive seismography to identify land masses under the polar ice cap, studied aurora and helped to record some 7,000 meteor observations.

Poulter was also a member of the United States Antarctic Service Expedition in 1939, and has received a National

Geographic award and two special Congressional Medals for his work in the Antarctic.

At the other end of the world, Poulter has directed research for the Navy at Point Barrow, Alaska, and worked on the Juneau Icefield Research Project at Taku Glacier, Alaska.

Since 1964, he has been making field trips to both the north and south polar regions to study the bio-acoustics of marine mammals. He describes himself as "a physicist and engineer doing physical measurements on biological subjects."

One of his goals is to prepare a catalogue of vocalizations of the 117 different species of marine mammals. So far, he has studied 60 percent of those species and has collected more than 600 miles of tape recordings.

The American Polar Society has members in 32 countries who are interested in the polar regions and sciences related to them.

Expert Says Sea Lion Whiskers Like Radar

STANFORD, Calif. (AP)—How does a sea lion hear? Chances are he tunes in on a whisker.

According to Dr. Thomas C. Poulter, a leading authority on sound and hearing systems among living organisms, sea lions' antenna-like whiskers are up to 10,000 times more sensitive than their ears.

Moreover, the 75-year-old senior adviser at the Stanford Research Institute believes such findings may offer important clues for electronic breakthroughs by man.

"Every time man makes a new development in sonar and radar," Poulter said recently, "we find that animals have been doing it for millions of years."

"My attitude is why do it the hard way. Let's find out how they do it and copy them—they're the experts...man is just a Johnny-come-lately."

After years of observing sea lions swimming in laboratory tanks and in their natural environment, Poulter about a year ago evolved the theory that most of the mammals' information is transmitted via their whiskers.

To test the idea, he placed electrodes on nerves leading

from the whiskers to the brain and implanted a comparison electrode in the sea lions' inner ear.

Poulter and his fellow researchers observed that the sea lions operate a biological sonar system, infinitely more complicated than man-made devices, by emitting small clicks which are picked up on the rebound by their highly-tuned whiskers.

Sea lions are even able to change frequencies according to the size and distance of the objects from which they take soundings, Poulter said.

Preserving Whales

CANBERRA, Australia—The Australian government has acted on a United Nations recommendation calling for the preservation of whales. Attorney General Lionel Murphy has announced a ban on the importation of whale meat and other whale products. Government officials say the ban will be greatly felt in the pet food industry where whale meat is widely used.

—UPI

The American Polar Society
has elected
Dr. Thomas C. Poulter

In
recognition
of his
contribution
to Polar
Exploration

— an
Honorary
Member —

January 19, 1973

F. Alton Wade
PRESIDENT

Polar Bear Is Put On a Treadmill

CAMBRIDGE, Ontario, Jan. 14 (AP)—A 600-pound polar bear, a Norwegian zoologist and a manufacturer joined in

an effort to save Canada's polar bears from extinction.

Dunder Equipment Ltd. made a belt treadmill for the bear to run on so Dr. Nils Oristland could study its blood pressure, heartbeat and other body reactions.

Neither buildings nor Pole stay in place

Morale important as research team copes with dry, bitter cold and aging quarters

The Christian Science Monitor
by R. Norman Matheny

Amundsen-Scott Station, Antarctica

The roof is literally being crushed by a 25-foot snowdrift. There is well over 1½ miles of packed ice under the floor. And with temperatures reaching as low as -113 degrees F. outside, you don't, at first, take seriously the claim that this is one of the world's largest deserts.

Nevertheless, the low rate of annual precipitation fully qualifies it, in spite of the snow that blows with the wind more than one-third of the time. Even that is exceedingly dry.

Under natural conditions no animal or vegetable life exists for hundreds of miles in any direction.

And because they might not get started again if shut off, the few tractors and vehicles used here are left idling year-round.

Fuel has to be flown in, but is not in serious shortage. Food and supplies for the men are stacked in the corridors underground. There is no shortage of that either; there is enough for even more than one wintering season.

Ice, but little water

But on this continent that has 95 percent of the world's permanent ice — some 7 million cubic miles of it — water is in short supply. Each man takes his turn shoveling snow into a melter, and in return gets less than one quick shower per week.

In the middle of this unlikely desert the Amundsen-Scott Station is an oasis that provides shelter for scientists and their Navy support personnel who stay year-round near the earth's geographic South Pole.

On a relatively balmy day, recording a high of — 50 degrees, last Feb. 13, the last plane out for the season left 20 men behind, 7 researchers and 13 Navy support personnel. They hope to see the next plane in November, after an austral winter in only radio contact with the outside world.

'Wintering over'

Among the 20 men "wintering over" at the South Pole until next November is a highly skilled electronics technician, Marvin V. Kempton.

Mr. Kempton has lived in isolated

situations so much it's getting to be a habit. This is his sixth "wintering" experience in arctic regions, five near the North Pole, and now this one right at the South Pole. Add one summer trip to 90 degrees south, and that makes seven polar trips for him in the last eight years.

He has been employed by the National Weather Service of the United States since 1965, and his duties include launching seven weather balloons daily, recording the messages tiny instruments send back and, with the aid of a desk-sized computer and daily radio relays, compiling information into what we know as the weather report.

The U.S. National Science Foundation conducts the operation and pays the bill, netting scientific data by the volume.

It is this kind of scientific research work that keeps most of the wintering-over crew busy. This and building.

Snow buries buildings

The structures the men presently live in were designed for about three years' use. This is now their 16th year in operation, and the main areas are buried under the constantly drifting snow.

By "deep freeze 75," the second winter from now, new quarters are expected to be completed. But construction is behind schedule, after two short seasons experiencing malfunctioning equipment.

To hint of the logistics involved, consider the arrangements necessary in merely getting the crew of 130 Seabees of the Naval Mobile construction battalion 71 from its base at Davisville, R.I., to Antarctica and back, a round trip of nearly 26,000 miles.

And even with the men on the site, they can work only during the short summer season between November and mid-February.

Heavy mittens and about 20 pounds of clothing allow the men to work outside half an hour for every half hour of warm-up time. Conditions occasionally push the ratio to 45 minutes inside for every 15 minutes of work outside. Beyond that, work must be halted entirely.

Exterior structures have to be assembled on the site, but the Amundsen-Scott Station's new living

quarters and research buildings will arrive in nearly complete modular sections. They will have traveled via sea to McMurdo Station, 840 miles away. They will make the final lap in the only means of transportation currently in use here, the U.S. Navy LC-130 four-engine turboprop.

With the work going so slowly and conditions so rugged, morale is important. Mr. Kempton says dedication and keeping busy are among the most important morale factors. He also rates quality of food and its preparation at the top of his list of morale builders.

In fact, passengers on the first plane in last November report that in several cases, it was vegetables, not mail from home, that got first attention.

Mr. Kempton smiles broadly as he recalls his gastronomic experiences on "T-3," a floating ice island at 87 degrees north, about 150 miles from the North Pole.

Munching whale blubber

The families of Eskimo employees at the station there shipped whale blubber to them regularly via the monthly mail plane. Mr. Kempton tried some once — and to his surprise, he liked it. After that, the men at T-3 spent many evenings sitting around and listening to the Eskimos tell of family life, all the while munching on tiny chunks of blubber.

It is "whitish pink" and, in small chunks, tastes "like watermelon — not fatty like pork chops."

"Just like watermelon?"

"Well, maybe a light fishy taste, too," Mr. Kempton allows. He insists that it causes a warm feeling as soon as it is eaten.

The men on T-3 got to liking the raw frozen meat so much that when the blubber ran out, frozen steaks began to disappear from the larder between mail planes.

Weather conditions at the South Pole being what they are, the scientists and support personnel could use a "warm feeling," too. And a good sense of direction.

Somewhat like a glacier, the entire area in which they winter over is slipping about 250 feet a year. A small stake marking the actual South Pole is move periodically. From its intended location the original station has not only been covered up, but it has drifted out of sight in the extreme whiteness.

Isolation on Antarctica

March 17

WASHINGTON (AP) — Four American researchers have just begun at least nine months in isolation on the frozen Antarctic continent to seek new information potentially important to worldwide radio communications.

The National Science Foundation said the scientists comprise "the smallest completely isolated American group to winter-over in the Antarctic since 1934 when Admiral Richard E. Byrd spent four months at a one-man outpost ..."

The men are holed up at America's Siple Station, less than 1,000 miles from the South Pole and 1,350 miles from coastal McMurdo Station, the nation's main science base on the White Continent. Siple station, built in 1970, sits atop ice more than a mile deep, and hitherto has been manned only during the so-called Antarctic "summer."

That "summer" is just ending, but the men can face temperatures as low as 65 degrees below zero Fahrenheit in the upcoming winter whenever they venture outside.

The research team includes team leader William J. Trabucco, 29, of Mountain View, Calif., and Evans W. Paschal, 27, of Issaquah, Wash., both of Stanford University; Jay C. Klinck, 29, of Concord, Mass., the team's mechanic; and Dr. Russell D. Threlkeld, 54, of Grandview, Wash., a physician.

Despite the isolation and the weather, life shouldn't be too rough within the camp's two attached buildings, each about 45 feet long and 25 feet wide.

"Approximately 10 tons of food, including lobsters, steaks, dehydrated shrimp, eggs covered with oil to keep them fresh, and concentrated liquid milk have been left with the men," says the NSF, which sponsors the U.S. Antarctic Research Program.

Also available are 60 movies, a radio, 500 paperback books and 500 technical books.

Scientifically, the team will concentrate on learning more about the ionosphere and the magnetosphere, regions of the earth's atmosphere which are

important for the transmission and receipt of radio signals.

Siple station is built at the bottom of a kind of "magnetic rainbow" made up of invisible lines of force in the earth's magnetic field. The other end of the rainbow dips down near Roberval, Quebec, Canada.

Using a 13-mile-long antenna, the Antarctic adventurers will try, with their colleagues in Canada, to learn more about the interaction between the electromagnetic waves of the magnetic field and electrified particles bombarding the earth's atmosphere

from the sun and elsewhere in space.

They occupy separate bedrooms of posh, snow-buried quarters with walnut walls, acoustically tiled ceilings, luxurious furniture, two lounges, tape recorders and Hollywood movies and an electronic organ for Tribucco to play.

They also have a full agenda of duties, including treks into continuous darkness through winds up to 80 miles per hour and temperatures down to 60 degrees below

zero to their radio receiving station.

They also will monitor and maintain the equipment that sends up low-frequency waves into the atmosphere from the antenna, stretching 6½ miles in each direction, held 17 feet above the snow on 350 20-foot towers.

The radio waves they send out have the same effect as lightning which triggers the colorful Aurora Australis. They take care of neutralizing subatomic particles out of their paths of travel above the globe, dumping them into the atmosphere.

Seal watchers at Scott Base

Iain Campbell likes to tell about the time his pal, Graeme Claridge, dragged the sleeping bags outside their 6 ft. by 6 ft. Antarctic tent for several nights when the tent was too full of equipment and supplies.

They don't recall how cold it was. But the temperature ranged from about minus 14 degrees F. to "almost up to freezing." It was so dry the only problem he had was oversleeping. So he set an alarm clock on a nearby rock.

Drs. Claridge and Campbell are geologists working for New Zealand's Department of Scientific and Industrial Research. They specialize in soil studies, in this case a few hundred miles from the South Pole at a remote site about 80 miles from Scott Base.

I arrived just after midnight to chat with the two geologists. Busy as they were, they took me out to a nearby pressure crack to enjoy a first sight of seals and seal pups lounging on the ice.

The two scientist-explorers, having arrived only a few hours before, were working through the "night" to get things ready for departure to their site later that morning. Quickest and best way to check equipment is to try everything out, they say, and started working again as they talked.

Their tent, a traditional "Scott" type, has a double layer of canvas to form a protective air pocket and sloped corners to fend off heavy winds. It is heated by their cooking stove, a tiny kerosene primus stove, the type many campers might recognize.

Though one sleeping bag would probably be enough, Iain says he likes the idea of having two, one stuffed inside the other, "just to be sure."

It felt a bit strange, using daylight at a quarter to one in the morning to take their picture. Like many newcomers to a polar area, it didn't seem right to stop the day's activities before it got dark. That takes several months down here.

Lab partners at McMurdo

Yuan and Arthur DeVries are an Antarctic rarity — a husband and wife team who share research on the ice.

Their subject is a cold-loving fish with the forbidding name *Trematomus borchgrevinkii* in which Arthur DeVries has been interested since 1965. It thrives in sea water at freezing temperatures. It rests happily even on ice.

Some of its cold tolerance is due to antifreeze in its body fluids, a biological adaptation possibly relevant to breeding frost-resistant citrus trees, among other things.

Now, under a two-year grant from the U.S. National Science Foundation, the DeVrieses are getting better acquainted with this remarkable fish in its Antarctic home waters.

Mr. DeVries (PhD biology, Stanford) is kept busy in the field, while Mrs. DeVries (PhD biochemistry, University of California) does most of the basic laboratory work.

After the basic research is finished, they will return to Scripps Institute. There Dr. DeVries won't have to fight the constant battle he says he has here with keeping his own operation going.

Dr. DeVries acknowledges that the Navy support team is quite busy with other more glamorous construction projects and more than enough logistic problems, but it was still a disappointment to get all the way down here and then be denied, officially, the three holes he needed drilled.

It takes a heavy rig, a big tractor to pull it, and several men quite a while to get holes through eight-foot-thick sea ice, and the last is 1½ miles from the first, out on McMurdo Sound. Dr. DeVries finally got it done by personal negotiation with the key men, who helped him on their off-duty time.

Away from all the comforts of more civilized surroundings, what do the DeVrieses miss most? Without hesitation comes the answer, "Yoki," their 40-pound "Keesh Dutch hound," waiting back in the States.

Land Link to Antarctica Hinted in Chinese Fossils

By WALTER SULLIVAN

Chinese scientists believe they have found convincing evidence that it was once possible to walk to China from the land now at the South Pole.

Their discovery in northwest China of animal fossils strikingly similar to those of the same period from Antarctica, South America and South Africa supports the view that those lands, now extremely remote from one another, were once close and linked by land bridges.

The latest discoveries, made in or near the Tien Shan mountains of Sinkiang (Chinese Turkistan), are described in a recent report of Sun Ai-lin of the Institute of Vertebrate Paleontology and Paleoanthropology of the Chinese Academy of Sciences (Academia Sinica) in Peking.

The fossil remains of reptiles and amphibians date from the Permian and Triassic Periods, between 200 million and 270 million years ago. It was during this time, according to the theory of drifting continental plates, that a supercontinent, which the theorists call Pangaea, began to break into two parts.

The northern one, called Laurasia, eventually fragmented into Eurasia and North America, and the southern one, called Gondwanaland, subdivided into South America, South Africa, Australia, Antarctica and India, the theory holds.

Similarities Noted

The Chinese findings support the view that a broad link between Laurasia and Gondwanaland survived long enough for the hulking beasts whose remains have been found, for example, in China as well as Argentina, to move freely between those places.

"Sinkiang was far beyond the supposed northern boundary of Gondwanaland," Dr. Sun wrote, but, he added, the vertebrate faunas of Sinkiang "show great similarities to those of the southern continents."

"As these vertebrates are land dwellers, it is difficult to imagine that migration could have taken place through wide seaways," he wrote.

Of particular interest to Western fossil specialists have been the extensive Chinese discoveries of *Lystrosaurus*, both in the Tien Shan area and in Shansi Province nearer Peking.

Lystrosaurus was a river-dwelling reptile and the South African rivers of the early Tri-

assic, some 230 million years ago, must have swarmed with these creatures.

When, beginning in 1969, a number of *Lystrosaurus* bones were found in Antarctica, that remote and isolated continent's former link to Africa was firmly established. Dr. Edwin H. Colbert, emeritus curator of paleontology at the American Museum of Natural History of New York, who first identified the Antarctic finds, has cited the Chinese discoveries as evidence for a link.

Despite the thousands of miles that now separate Africa from China, he wrote, "the faunal relationship of China to South Africa evidently was close."

'Paleontological Beads'

In his book "Wandering Lands and Animals" to be published in July by E. P. Dutton, Dr. Colbert says the far-flung occurrences of *Lystrosaurus* "are in a sense the paleontological beads from a broken string, each occurrence separated from the others by thousands of miles of deserts and grasslands, mountains, jungles, or open ocean."

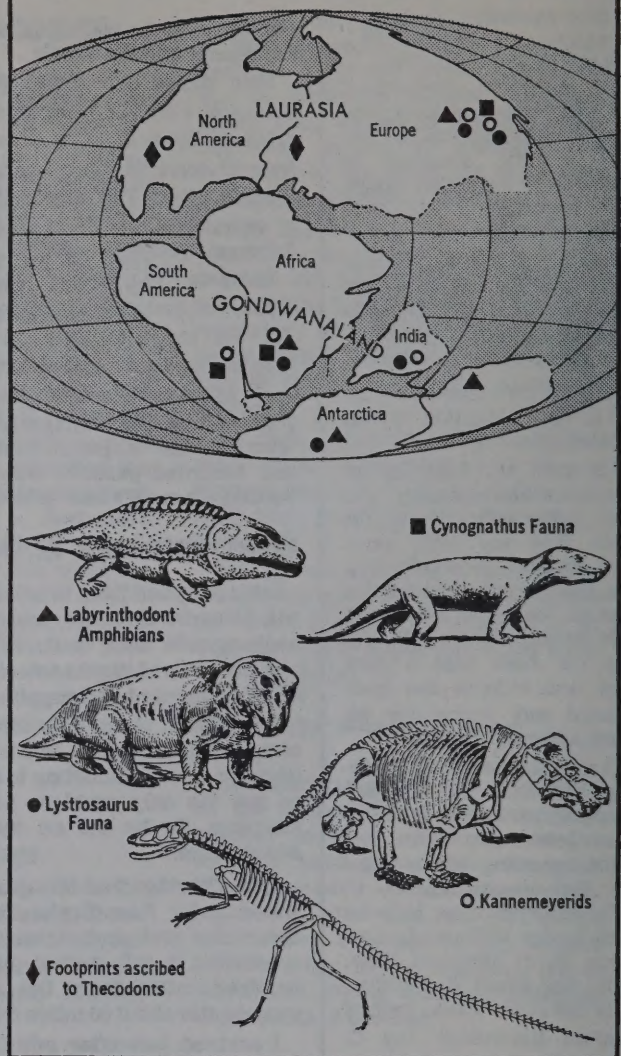
Yet, he continues, the petrified bones of this ancient reptile "are so nearly identical, wherever they occur, that it seems evident the several populations of *Lystrosaurus* were in early Triassic time inhabiting a region within which they could move freely."

In the February issue of *Scientia Sinica*, recently received in this country, Dr. Sun tells of the discovery of Kannemeyrid remains in a layer above the *Lystrosaurus* zone on the north slope of the Tien Shan. These hulking creatures had been found in almost identical form in Africa and across the Atlantic in South America, suggesting that these lands once abutted one another.

A small lower jaw fragment from a *Labyrinthodont* has also been found in Sinkiang. These primitive amphibians are so named because of the *Labyrinthine* structure of their teeth. They are common in the Indian, South African and Antarctic deposits and their scarcity in China, according to Dr. Sun, is puzzling.

While remains of the dog-like *Cynognathus* reptiles have been found farther east in Shansi Province, they have not yet been identified in Sinkiang. These animals represent an early stage in the evolution of one branch of the reptiles into mammals.

The World of the Permian and Triassic Periods, 200 to 270 million years ago.



The New York Times/June 25, 1973

Recent fossil finds in China, indicated by symbols in upper right corner of map, confirm a former link to southern continents, including Antarctica. The map shows the arrangements of continents of that period reconstructed by Robert S. Dietz and John C. Holden.

A Good Way Is Developed For Transferring Cement

FAIRBANKS, Alaska (UPI)—Technicians working an oil exploration on Alaska's north slope have come up with an unusual way for transferring tons of cement from one location to another.

The powdered cement is blown through hoses connected into similar tanks fitted inside huge cargo compartments of L-100,200 Hercules aircraft.

The cement is off-loaded in the same manner, without breakage or waste. Halliburton Services at Fairbanks says it takes just 15 minutes to load and off-load each shipment of 39,000 pounds.

Tractor Replaces Dog

WELLINGTON, New Zealand, Dec. 26 (AP)—Most husky dog teams at New Zealand's Scott Base in Antarctica have been replaced by tractors. Dog handler Richard K. McBride said he hoped the rest of the "great friendly buffons" would be brought back to civilization as pets in 1973.

Antarctic's Age Is Showing

MOSCOW (AP)—Researchers of the Ukrainian Academy of Sciences have concluded that the Antarctic is four billion years old instead of the previously believed two billion, according to Tass, the official Soviet press agency.

A Soviet Ship Is Adrift in Antarctic Ice



Tass

The Ob, the Soviet Union's main Antarctic supply ship, shown in Mirny. Sixty people were evacuated from the vessel as she drifted helplessly in the Antarctic ice.

By THEODORE SHABAD

The New York Times

MOSCOW, June 12—The Soviet Union disclosed today that its main Antarctic supply ship, the Ob, became caught in ice early in April and has since been drifting helplessly off the icy continent.

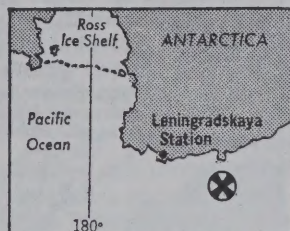
The Government newspaper Izvestia said that 50 polar scientists and 10 crew members were evacuated yesterday by helicopter to another expedition ship, the Navarin, standing by 150 miles away.

Eighty people remain aboard the trapped Ob, which is drifting northwest at a rate of three miles a day, and officials hope she will survive the tremendous pressures of the ice against her hull and reach open sea toward the end of July.

However, the Soviet Government is taking no chances and has sent a third expedition vessel, the research ship Professor Zubov, back to the Antarctic to assist in the rescue operation if needed. The Professor Zubov had already returned to Leningrad from this year's Antarctic cruise.

The three ships have been going to the Antarctic each year to relieve the crews of the Soviet Union's six permanent research stations and to conduct oceanographic investigations of their own. Moscow has played an active role in Antarctic exploration since 1956.

In that year a number of nations, including the United



The New York Times/June 13, 1973

States, Britain, Japan, Argentina, Chile, France and Australia, established a network of permanent stations as part of the International Geophysical Year (1957-58), a coordinated program of earth studies.

The stations remained after the completion of the special geophysical program, and a broad range of scientific activities has been conducted by several nations since then. Scientists have been exchanged regularly among the various national research stations and expedition ships such as the Ob have been visiting Antarctica regularly to resupply the

various outposts.

According to the Soviet press accounts, the Ob was trapped in ice during a storm while she was resupplying the research station at Leningradskaya, established on Oates Coast two years ago. The incident had not been previously reported.

The Ob's present position was given as 150 miles off the George V Coast and north of the Antarctic Circle. This appeared to put the ship roughly at Lat. 66 degrees S., Long 152 degrees E.

The slow northwest drift has now taken the Ob out of the continuous darkness of the Polar winter night within the Antarctic Circle into an area that has two to three hours of daylight every 24 hours.

The Soviet reports indicated that the daylight had made possible the helicopter evacuation of the 60 people yesterday.

Soviet ship-based helicopters and shore-based planes are being used to reconnoiter ice conditions ahead of the Ob in the hope that fissures opening up in the ice may enable the vessel to fight her way out of the trap. The Ob has a gross tonnage of about 7,500.

Rare Seagull Colony Found

MOSCOW (UPI)—A colony of rare black seagulls has been discovered on the Siberian Lake Alakul by researchers from the Kazakh Institute of Zoology.

Icebreaker Fuji Returns to Tokyo

April 21

The 7,760-ton icebreaker Fuji returned to Tokyo Friday from a four-and-a-half-month expedition to the Antarctic.

Ten members of the 14th Antarctic expedition team returned aboard the ship from Japan's Showa Base at the South Pole.

Leaving Tokyo last Nov. 25 with a new 30-man wintering team, the Fuji reached the fringe of polar ice packs about 72 kilometers north-northwest of Showa Base on Ongul Island on Jan. 1.

Unable to berth itself at the base, however, because of bad ice conditions, it exchanged the new and old wintering teams by helicopter.

It also airlifted 470 tons of supplies to the base.

Last Scott Crew Member On Antarctic Voyage Dies

SHEERNESS, England, June 22 (Reuters) — Edward McKenzie, last surviving crew member of the ship that took Capt. Robert Scott on his final, ill-fated exploration of the Antarctic, died in the nearby village of Minster today. He was 85 years old.

Mr. McKenzie was chief petty officer aboard the whaler Terra Nova, which sailed for the Antarctic with Captain Scott on Nov. 29, 1910. Captain Scott and his close companions died in a blizzard soon after reaching the South Pole, only to find that the Norwegian explorer Roald Amundsen had arrived there first.

After the voyage, Mr. McKenzie served for 27 years with London's Metropolitan Police and gave lectures about Captain Scott until he was over 80. He built a working model of the Terra Nova that is displayed in a London museum.

Danish Panel to Prepare Home Rule for Greenland

COPENHAGEN, Denmark, Feb. 10 (Reuters) — The Danish Government has agreed to set up a commission to work out home rule for the province of Greenland.

The seven-man commission will be headed by Knud Hertling, Minister for Greenland. Its first meeting is planned for next month. Mr. Hertling said he expected its work to be completed in five years.

Research Voyage Finds Atlantic Ocean 'Breathes'

By WALTER SULLIVAN

The New York Times

April 3

A nine-month voyage from the Arctic to the Antarctic by the research vessel Knorr has led to the discovery that carbon dioxide produced by the smokestacks of the Northern Hemisphere is being "inhaled" by North Atlantic waters and "exhaled" by the South Atlantic.

It has been feared that current production of that gas by industrial activity exceeds the capacity of the oceans to absorb it. This would lead to a build-up of carbon dioxide in the atmosphere and possible climate change.

The new finding does not resolve this question, but does indicate that the oceans are still capable of removing the gas from the most polluted latitudes. For this reason Dr. Haro Takahashi of Queens College, chief scientist on the final leg of the ship's 30,000-mile journey, termed the finding "good news."

However, he told a news conference on the ship here yesterday that the long-term implications would not be clear until after much further study. Tracing the path of carbon dioxide through the world oceans is one of the goals of the international project of which the voyage of the Knorr was a part.

The measurements indicated that the gas was being absorbed by the ocean in the North Atlantic, whereas in the southern part of that ocean, it was returning into the atmosphere.

The ship arrived here Sunday, on the way to her home port at Woods Hole, Mass., to enable participants in the current United Nations conference on control of the sea bed to visit the vessel. A reception for United Nations delegates is to be held aboard this afternoon.

The journey of the Knorr took her from the icy waters of the Greenland Sea to equally frigid waters near Antarctica. The ship is operated by the Woods Hole Oceanographic Institution.

The project is known as the Geochemical Ocean Sections Study, or GEOSECS. Ships from France, Japan and West Germany are also to participate, as well as the sister ship of the Knorr, the Melville of the

Scripps Institution of Oceanography in California.

The Melville will survey the Pacific, using the same sampling and measuring devices as those aboard the Knorr. They are said to be the most elaborate and highly computerized equipment of this sort ever taken to sea.

Carbon dioxide, generated by combustion, is a focus of attention because, in the atmosphere, it acts like the glass roof of a greenhouse, permitting sunlight to pass through and generate heat, but inhibiting the escape of that heat. Hence it has been feared that a significant increase in atmospheric carbon dioxide could upset the world's climatic balance.

Dr. Paul M. Fye, the director at Woods Hole, said no research ship had ever been equipped with such sophisticated devices for chemical analysis, many of them automatic and computer-controlled.

As Dr. Arnold Bainbridge of Scripps pointed out, "the automated stuff doesn't get seaskick." Nor do computers suffer from the boredom of long months at sea. And at times the going was rough. Dr. Takahashi said he was thrown out of his bunk a few days ago as the ship fought through a storm on her way to New York.

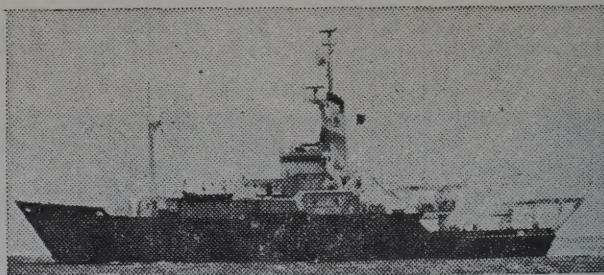
Near the southern extremity of the Knorr's journey she suffered her most serious mishap. This was the loss of a computer controlled deep-water sampling and measuring unit and some 4.5 miles of cable.

The accident occurred during an effort to collect water from within one of the deepest parts of the ocean—the South Sandwich Trench. The sampling unit, mounted on a circular frame, or rosette, is a major innovation in oceanic research.

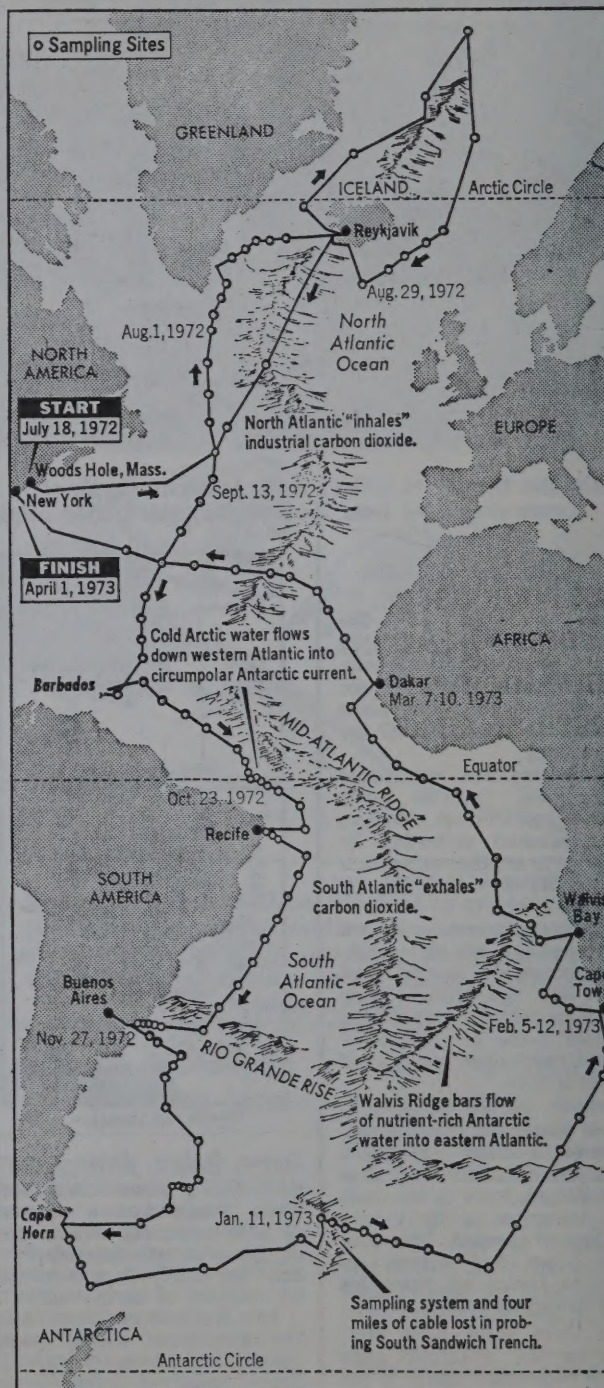
As it is lowered into the depths, its instruments transmit to a computer on the ship continuous readings of water temperature, salinity, oxygen content and sediment density. This information is displayed as an electronic graph on the computer scope.

One of the surprises has been the revelation, by this system, of layers at great depth in the sea where there seems to be turbulence. These regions are manifested by sharp peaks in sediment content and abrupt changes in temperature.

When such layers are



The research vessel Knorr, 245 feet long, 2,075 tons



The New York Times/Stephen Hadermayer/April 3, 1973

On her nine-month journey, ending here Sunday, the Knorr sailed 30,000 miles, collecting samples at 121 sites.

reached, on the upward journey of the rosette, a command signal from the ship can seal one of about a dozen sampling

tanks on the rosette, capturing a water sample for detailed study. While the loss of one rosette and much cable was a

handicap, there were spares, and the sampling continued.

An unexpected find was the manner in which the Walvis Ridge in the South Atlantic bars the flow of cold, nutrient-rich water from Antarctica into the eastern Atlantic. This ridge links Africa to the Mid-Atlantic Ridge that snakes down the full length of the Atlantic.

South of the Walvis Ridge the cold water, rich in phosphates, nitrates and silicates, could be followed from station to station. North of the ridge, it vanished.

A major goal was to trace the southern flow of cold water from the Arctic along the western edge of the Atlantic basin. It was shown that this water, also rich in nutrients, flows all the way south to join the great circumpolar, clockwise flow around Antarctica.

Detecting Trends

The movement of nutrients through the sea provides the life blood of oceanic life. On board the Knorr these substances were recorded by an automatic analyzer originally designed for blood samples.

Another task of the survey was to establish baselines for the future. That is, it was to determine the present, top-to-bottom nature of the oceans so that future generations can detect adverse—or beneficial—trends.

The sediment content of the water at depth was determined by means of a laser-beam aimed directly upward from the rosette platform. The beam is normally less than pencil-width, but material in the water scatters its light, and this effect is recorded.

This device sometimes produced a spectacular display as the rosette was being hauled up after a night-time sampling. Its sharp spot of red light could be seen at considerable depth, but when a sea creature passed through the beam, there was a "fireball" in the depths.

Since some of the desired measurements were of trace amounts of radioactive material, both natural and man-made, some very large, water samples were needed. For this a "sea sucker" was used—a hose that could be lowered to draw in water from a depth of 1,300 feet.

After each leg of the journey these and other water samples requiring analysis of which the ship was incapable were shipped back to Woods Hole. Dr. Fye quoted Emerson Hiller, the ship's captain, as contending, half seriously, that enough water had been sent home "to sink the ship three times."

Polar Explorer Found Treasure---Clean Air

WASHINGTON, March 1 Undersea explorer Jacques Cousteau reported Thursday finding one of the earth's great remaining treasures lying above the ocean in Antarctica—air so clear and pure it is like "the atmosphere of our infancy."

The 62-year-old Cousteau recalled that when he was a boy in France the air was so free of smog "you could see the Alps from Paris, but no more." That is the way it still is at the South Pole, he said, with visibility of 200 to 250 miles.

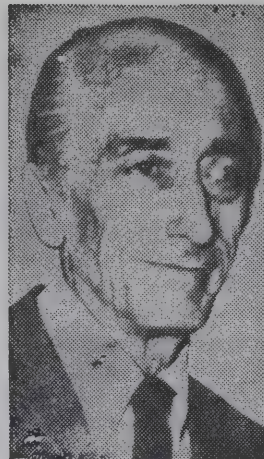
The French oceanographer appeared at a news conference sponsored by the National Aeronautics and Space Administration to report on his recent escape from icebergs during an Antarctic exploration aboard the 141-foot Calypso. The expedition ended Feb. 20.

After ice chunks smashed one propeller and damaged a second, the Calypso limped across Drake Passage and finally reached Ushuaia, Argentina, thanks partly to weather and iceberg information transmitted to Cousteau by U.S. satellites.

Cousteau told of winds that rose from nothing to 60 m.p.h. in five minutes, forcing the Calypso to circle for three days in a small ice-free area beneath a huge iceberg that looked as if it might topple onto the craft.

The ship had been anchored until the winds came up and hurled small icebergs — 10 times the weight of the Calypso—against the boat, putting a hole in its side and damaging the propellers.

"Icebergs are very friendly in normal circumstances — big and slow moving," Cousteau said. "But little icebergs, they jump on you when the wind comes."



JACQUES COUSTEAU

Cousteau spoke glowingly of the clear, smog-free air. "The atmosphere is amazingly pure," he said. "Water pollution from pesticides and heavy metals is not yet dangerous, but is worrying for the penguins," he said.

In awed tones, Cousteau told of the most amazing incident of his voyage.

At 4 a.m. one night in January he was roused from sleep by something banging against the side of the Calypso. Looking out the porthole, he saw a small boat with a broken mast. Seeing no sign of life he went back to sleep.

He awoke about 7 a.m. and suddenly saw emerging from the badly broken up boat a "strange, hirsute figure" whom he took aboard, thawed out and fed.

Cousteau then radioed the following message to NASA:

"At 4 in the morning met the Ice Bird, a small sailing boat with Dr. David Lewis, solitary circumpolar navigator. Both ship and man in pretty bad shape but alive and in good spirits. The Ice Bird capsized about two months ago and broke its aluminum mast. Lewis carried on with an emergency short boom as a

mast and everything on board was completely soaked in sea water and freezing temperatures. He intends to repair as well as he can and to sail again in the direction of the Cape of Good Hope. Incredible but true."

Cousteau Derides A Plan to Convert Icebergs to Water

The New York Times

LOS ANGELES, Calif., Feb. 24—Capt. Jacques Cousteau, the oceanographer, has described as "nonsense" a federally funded effort to determine the feasibility of towing icebergs from Antarctica to the United States West Coast as a source of fresh water.

"People who have worked on this project know nothing about icebergs," the famed undersea explorer said this week in response to questions about a study disclosed in The New York Times.

The report said that the Scripps Institute of Oceanography in La Jolla, Calif., and the Rand Corporation were re-studying, with new enthusiasm, an "iceberg train" theory that was abandoned as a "wild dream" 16 years ago.

In essence, the theory is that icebergs can be cut loose, lined up and towed to coastal waters, where they could provide water purer than that sold commercially in bottles.

Captain Cousteau, landing at the Los Angeles International Airport after an ill-fated filming expedition to the Antarctic, said, "Advanced equipment provided us by the National Aeronautics and Space Administration shows some icebergs to be as much as 30 miles in diameter."

"There are very weak lines in icebergs" that would cause them to "crumble into a million pieces," he said.

An iceberg smashed a hole in the hull of Captain Cousteau's wooden cruiser, Calypso, last weekend, causing what he called a "very serious situation for a little while." Storms and the death of his first mate forced an early end to the expedition.

Russians Visit Fiji

Suva, Fiji, May 7 (AP)—Twenty Soviet whalers and their 700-foot mother ship, the Sovetskaya Rossiya, have been granted permission to enter Suva harbor tomorrow for five days on their way home from Antarctic waters.

U.S. and Soviet Complete Ice Study in Bering Sea

By THEODORE SHABAD

The New York Times

MOSCOW, March 7—Soviet and United States ships and planes have braved snowstorms and heavy seas in the last three weeks to complete an unusual joint research project on ice and weather patterns in the Bering Sea, between Alaska and Siberia.

The scientific experiment, conducted under a weather satellite agreement signed by the two countries in 1971, involved closely coordinated measurements and mapping of the sea surface and of the atmosphere by instrumented aircraft, weather ships and the Nimbus 5, an American weather satellite.

The results of the project are expected to contribute to a better understanding of ice conditions in the region and thus improve navigation forecasts in the Arctic latitudes, a crucial aspect for the Soviet Union with its long northern coastline.

The joint investigation was conducted in a cooperative spirit that would have seemed unlikely only a few years ago. It reflected the increasingly close scientific cooperation between the two countries in this era of relaxation of tension.

According to published Soviet progress reports on the experiment, which began Feb. 15, a Soviet IL-18 plane, especially equipped for aerial surveys, and an Alaska-based Convair 990, operated by the National Aeronautics and Space Administration, have completed five joint flights of about seven hours each despite the harsh weather conditions typical of the Bering Sea at this time of year.

While instruments aboard the two planes recorded air and sea conditions, the Soviet weather ship Priboi and the United States Coast Guard ice-breaker Staten Island conducted simultaneous scientific measurements.

During at least one of the joint aerial surveys, the satellite Nimbus 5 passed over the area, according to a reporter of the Soviet Government daily, *Izvestia*, who accompanied scientists on one of the IL-18 sorties. The coordination of aerial and satellite surveys adds to a better understanding of satellite findings by providing a cross-check at lower altitudes.

Both the research planes and the American satellite, the most advanced of the Nimbus series, carried microwave sensors,



The New York Times/March 8, 1973

Joint U.S. and Soviet ice studies were held on opposite sides of date line.

high-precision instruments capable of measuring the heat radiation emitted by the earth's surface and of mapping surface ice and water through clouds.

Pointing up the close collaboration required in the Joint Bering Project, as it became known, the Soviet press agency, Tass, noted that scientists of the two countries were in radio contact twice a day between Anchorage, Alaska, the American base for the project, and the small Siberian settlement of Cape Schmidt, where the Soviet research plane was based.

During these radio sessions, conducted in English, Russians and Americans exchanged data obtained by their planes and ships and laid out the study program for the coming days.

Under the agreement, each country conducted its part of the experiment on its side of the International Date Line, which forms the international boundary in the Bering Sea area. The American Coast Guard ship operated in the sea ice between latitude 58 and 63 degrees north and longitude 174 and 178 degrees west. The Soviet ship worked just to the west near longitude 179 degrees east.

The American part of the experiment was headed by Dr. William Nordberg of the space agency's Goddard Space Flight Center, Greenbelt, Md., which is concerned with weather satellites. The chief Soviet scientist was Kirill Y. Kondratyev, a leading authority on satellite sensing of the environment.

Student Explorations

The New York Times

KALAMAZOO, Mich., June 9—Today's college student—keen on sailing and water sports—may be a front-runner in tomorrow's world of exploration. This is the opinion of Prof. T. P. (Ted) Bank 2d of Western Michigan University and the director of the American Institute for Exploration.

Professor Bank, youthful and bearded in the Edwardian manner, is an author, anthropologist, former Fulbright scholar and leader of more than 30 expeditions into the Aleutians and the Bering Sea.

Western Michigan University recently approved a world explorations program based upon the work of Prof. Bank. For more than a decade, Bank has led students to the Aleutians; the Canadian Arctic; the Sea of Okhotsk north of Japan, and the waters of southeast Asia. He now embarks on a program of world-wide exploration which, for students at Western Michigan, carries up to 40 hours of university credit.

"The boy or girl knowledgeable in boating may, at times, be a head-starter in the field," said Bank. "The student well-versed in water sports—in skiing or in skin diving—often shows an ability to cope with the unexpected in a new environment."

Students who apply for the program at Western Michigan are asked to document their experience in travel, camping, boating, scuba and skin diving, skiing and mountain climbing. In addition to lab work and field research, applicants are asked their knowledge of photography, ham radio operation, cooking, carpentry and motor maintenance.

On each expedition, Bank makes use of a 15-foot inflatable boat powered by a 40 horsepower outboard. This boat carried a crew of four and a ton of equipment on an 1,100-mile reconnaissance of Unalaska Island several years ago.

Aleutian field trips take place in July and August. The trips span the chain of islands separating the North Pacific from the Bering Sea. Field work includes the photographic recording of archaeological sites—caves, graves and abandoned Aleut villages; preservation of

specimens for museum use; the study of flora and fauna on the islands; tracing the migration of sea birds; the study of marine biology; diving and the exploration of shipwrecks.

"In our culture," Bank says, "the step from childhood to adulthood is ill-defined. The period of emotional and physical dependence upon one's elders has been prolonged outrageously. The opportunities for discovering and proving maturity are increasingly denied to youth. There is need for vigorous, demanding experience. This experience should replace the apathy or violence toward which many youngsters turn.

"In recent years, institutionalized education has been confined, by and large, to the classroom. With exploration, we provide an opportunity of learning through field experience. The student becomes more actively involved in the learning process. The experience provides for self-discovery and development of the whole person outside the academic cloister."

Bank will lead a group of students to the Aleutians this summer.

No more trophies for Alaskan hunters

By Reuter

Anchorage

Alaska's role as producer of sealskins for the world's garment industry and polar bears for sportsmen's trophies has been suspended indefinitely by the enactment of the federal Marine Mammal Act, and about 50 commercial seal hunters and 60 polar-bear guides are out of business, at least for a few years.

But the state's 60,000 natives—Alaskans of Indian, Eskimo, or Aleut descent—are exempted from the federally enforced ban on killing or importing such marine mammals as polar bears, seals, sea lions, walrus, sea otters, and whales—providing these people use the animals for subsistence or making of traditional native arts and crafts and do so without waste.

Commercial fishermen also may take mammals for the next two years to protect their nets against raiding predators.

New Coast Guard Icebreaker To be Most Powerful Afloat

The world's most powerful icebreaker—capable of cutting through ice up to 21 feet thick—is now under construction at the Lockheed Shipbuilding and Construction Company in Seattle.

Named the Polar Star, the vessel is being built for the U.S. Coast Guard at a cost of \$52 million. The first icebreaker built by the United States since 1954, the 400-foot craft is destined for duty in the Arctic and Antarctic.

With a gas turbine capable of generating 60,000 shaft horsepower and diesel-electric engines rated at a total of 18,000 shaft horsepower, the new Coast Guard icebreaker will pack one and one-half times the power of the Soviet Union's "Lenin," presently the most powerful icebreaker afloat.

At a continuous speed of three knots, the ship is designed to

break ice up to six feet thick. By ramming, it is estimated the vessel will be capable of cutting through 21 feet of ice.

The power plant is being supplied by Turbo Power and Marine Systems, Inc., a subsidiary of United Aircraft. The ship will have three controllable pitch propellers to provide maximum control while breaking ice.

Each propeller will be powered by one 20,000 horsepower Pratt & Whitney Aircraft gas turbine, or two 16-cylinder diesel engines manufactured by the Alco Engines Division of White Motor Company. In addition, three 8-cylinder Alco diesel will provide the ship's service electrical power.

In open water, the six Alco diesel engines will provide a cruising speed of 17 knots and a range of more than 28,000 miles.

The ship will accommodate

155 crewmen and officers, and a team of 10 scientists. A flight deck will accommodate two HH-52A helicopters, used for ice pack reconnaissance.

A unique concave bow will allow the breaker to ride up onto the ice and break through with the combined force of its forward motion and downward thrust.

Two oceanographic labs and a meteorological lab will be augmented by two portable vans. The vans would be shipped to a scientist's laboratory for installation of equipment before a cruise, then mounted on the ship's deck. After the cruise, the van would be shipped back to the laboratory for the completion of experiments.

The ship will also be equipped with a computer center for transmitting data ashore.

MANY SEEK TO SHARE IN ALASKA'S MILLIONS

WASHINGTON, Feb. 3 (AP)—A global search is turning up thousands of unexpected claimants for shares in a \$9625-million payment settling land claims of Alaska's Eskimos, Aleuts and Indians.

The searchers said that the settlement might be shared by as many as 80,000 natives instead of the 55,000 to 60,000 estimated when Congress authorized the payment in 1971.

The 1971 law authorized appropriations totaling \$462.5-million over 11 years, payments totaling \$500-million in royalties from oil and other mineral production on federal lands in Alaska and grants totaling 40 million acres of land to native villages.

George A. Walters of Anchorage, who heads the search for out-of-state claimants, said at a news conference Wednesday that earlier estimates had failed to consider the number of natives living in Alaska's cities and outside the state.

More than 65,000 natives have been counted by official enumerators in 229 villages and cities in Alaska and 7,500 applications have been received from outside Alaska, Mr. Walters said.

He estimated that about 60,000 residents of Alaska and possibly as many as 20,000 natives living outside the state might qualify by proving they are at least one-quarter Alaska Eskimo, Aleut or Indian.

Alaska's Ice Classic, a Lottery, Closely Watched by Tax Agents

The New York Times

ANCHORAGE, May 8 — In 1917, members of the Alaska Engineering Commission survey team that was building the Alaska railroad began wagering about when the ice on the Tanana River would break. Since then the Nenana Ice Classic has been the greatest game of chance in the 49th state and has led to direct involvement by the Internal Revenue Service.

Every year, the residents of Nenana, a hamlet at the junction of the Tanana and Nenana Rivers 60 miles south of Fairbanks, organize a statewide lottery to make money for community improvements and entertain themselves.

In barrooms from Nome to Ketchikan, they debate systems for beating vagaries of the weather that determines "breakup," the real sign that spring has arrived.

At Nenana a heavy instrument is anchored in the Tanana ice and wired to a clock on shore that marks the moment when the ice has moved downstream 100 feet and the great roar of the spring flood begins.

As breakup starts, the clock stops, a siren goes off and thousands of people holding \$1 tickets on the \$110,000 Nenana Ice Classic look at their watches.

The Internal Revenue Service, which gets 10 per cent off the top of ticket sales at 110 establishments holding Federal wagering stamps, then begins to review the hundreds of informal "minute" pools won by bettors in nearly every bar and office building in Alaska.

At 4:59 P.M. last Friday, the 30 or so inches of Tanana ice tripped the tripod timer and 58 ticket holders split the official pot and the office minute pool.

In other years, the ice went out as early as April 20 and as late as May 16. This year, according to the nine-pound official book of bets, about 47,000 bettors watched their money go down the river before the ice did.

Even most winners did not get a bag of gold. Eileen Nash of the 22-member Anchorage Borough School District pool said, "We figure we'll get \$85 and that's before we pay taxes."

U.S. and Russian Eskimos Share in the Political Thaw

NOME, Alaska, April 14 (AP)—American Eskimos and their Russian counterparts from Siberia have met for the second time in a year at the international dateline to exchange gifts and conversation.

The meetings took place on April 2 and 3 on the Bering Sea ice between Little and Big Diomed Islands. One participant said that there was much conversation in contrast to last April when the men just exchanged smiles.

One Alaskan Eskimo said the main topic of conversation was the possibility of once again having free travel between Alaska and Siberia, as before World War II.

A Group in Canada Calls Eskimo a Derogatory Term

OTTAWA (AP)—Inuit Tapirisat, the national organization representing Canada's 17,000 Arctic inhabitants, plans to ask the Northern Affairs Department to drop the word "Eskimo" and use "Inuit" instead.

The group says that Eskimo — meaning raw-meat-eater — is a derogatory term.

Inuit means man or humanity.

SATELLITE PLANNED FOR LINK TO ALASKA

March 13

RCA Global Communications, Inc., and RCA Alaska Communications, Inc., filed yesterday with the Federal Communications Commission for authority to build and operate an interim communications satellite by Aug. 1. The \$7.4-million domestic network would use the Telesat Canada satellite tied in with five earth stations to provide

voice, message and TV traffic between both coasts and Alaska.

Eugene D. Becken, president of RCA Global, said the "interim system" would be designed to provide early satellite communications within this country until a domestic satellite system could begin operations. He added that earth stations used on the interim basis could be shifted to permanent system usage "at no material cost."

Spotless Cocoon Harbors Arctic Oil Sentries

By Edward J. Fortier
FROM PRUDHOE BAY, ALASKA

Beneath this wind-whipped desolation of Arctic ice and snow lies one of the world's largest lakes of oil. And though many Americans again this winter are shivering through heating-fuel shortages, the vast pool of energy found five years ago here under Alaska's North Slope is still untapped—locked out of grasp.

The main obstacle is a court order halting work on a planned 789-mile pipeline to race it south to the ice-free port of Valdez and thence to fuel-hungry consumers elsewhere. So for now the handful of oil-field veterans manning this outpost for the principal companies involved have become sentries living with the treasure.

I flew here from Anchorage to find out how the 35 men occupying the operations center of the Atlantic Richfield Co. (Arco) and the Exxon Co., U.S.A., survive the isolation, the fierce weather, and the waiting. They are marking time until the final disposition of a work-stopping injunction issued in April 1970. Last month a Federal appeals court ordered restoration of the injunction against Federal land permits for the line on grounds that existing law wouldn't permit a right-of-way wide enough for the project. As a result of that ruling, pipeline proponents are expected to seek legislation to amend the Mineral Leasing Act.

The appeals court did not rule on the environmental issue that is at the heart of the opposition to the pipeline. This argu-

Waiting to Tap Alaskan Oil and Gas, Workers Survive Implacable Cold

ment, which ultimately may be decided by the Supreme Court, has been made mainly by environmentalists who say the pipeline, with its cargo of hot oil, would cause lasting ecological damage to the permafrost and could burst with spills.

Refrigerator Door

The last leg of the trip to the center was by heated bus, which stopped within 50 feet of the center's front door. I stepped out into the sterile twilight of the Arctic noon. The temperature was 38 degrees below zero Fahrenheit, and the wind was 15 m.p.h. I jerked the spring-lock handle of the heavy refrigerator door and entered the brightly lighted operations center. On the lobby wall I saw a chill-factor chart. The cold and wind I had just left amounted to a chill factor of 84 degrees below, I learned—an environment of "great danger," weather in which exposed flesh freezes in 30 seconds. It could have been colder. Prudhoe Bay's chill factor often approaches 100 degrees below zero, and several times it has fallen to 110 below zero.

"It's cold out there, all right," said Jim Le Clair, an Arco construction engineer who has been at Prudhoe Bay since the promising days of 1969, "but it's warm

in here. Seems ironic that in many places in the smaller states it's cool inside as well as outside this winter." He was referring to factory and school closings in some states because of natural-gas shortages. "We're ready and willing to produce and deliver oil and gas," Le Clair added, "but we've learned the hard way not to get our hopes up."

This self-contained miniature city could house 210 men if the petroleum industry were allowed to get its North Slope product to market. The product is 9.6 billion barrels of oil and an estimated 26 trillion cubic feet of natural gas for which the skeleton crews under Bud Lund, field coordinator, serve as caretakers. BP Alaska Inc., the other major owner of an underground lake of oil about 25 miles long and 8 miles wide, has a Prudhoe-based crew about half the size of the Arco-Exxon staff.

Frozen Readiness

Pointing to a row of six "Christmas trees" only a few yards apart, C.H. Rosenthal of Exxon explained that the cluster of ornate well-cap devices was designed to drain the oil from six square miles. He said each of the sealed wells would produce 10,000 barrels of oil every 24 hours when production starts. With work suspended, the silent wells are waiting—as are acres of pipe and rows of idle trucks—for a start signal.

Oil experts here estimate that even if work on the trans-Alaska pipeline started this year, which is now unlikely, oil probably wouldn't flow through the pipeline until 1976.

The pipeline-construction delay is also said to be resulting in other difficulties. The more than \$900 million gained by Alaska in the 1969 North Slope lease sale led to a spending binge. It was inspired by an expectation of royalties from the eventual 2 million barrels of oil per day that were to start moving through a trans-Alaska pipeline by 1974. The \$900 million is shrinking fast. Alaska, with annual budgets exceeding \$300 million, is headed for economic troubles. Gov. William A. Egan says the state will be bankrupt by 1978 at the present spending rate and without receiving royalties and taxes from Prudhoe Bay fields by 1976. Finance leaders in the Legislature say Egan's \$357 million budget for fiscal 1974 must undergo extensive surgery; the governor says it was based on expected income presuming pipeline construction began this year.

With start of construction set back probably a year or more, state and Federal officials have been attempting to devise strategies to reduce or eliminate the delay.

Yet even without the pipeline, the North Slope oil find already has produced some beneficial results. A major dividend from the Arco-Exxon work at Prudhoe Bay is the more-certain knowledge that man can work and survive in the hostile Arctic.

Costing more than \$8 million, the Arco-Exxon fortress against the implacable



Acres of pipe stacked in Arctic snow would race Prudhoe oil to port.

cold is a model of efficiency, probably the cleanest and neatest government or industry installation in Alaska. If cold is the enemy, heat is the essential friend, and the Arco-Exxon center uses natural gas from the one operating well in the field to power a bank of 1,000-kilowatt generators. These produce electricity that does everything in the facility, including providing heat.

Food Fights Cold

Water for the operations center comes from a deep hole in the Sagavanirktok River, moving through a heated mile-long pipe. All sewage is processed in a two-stage treatment plant that is one of the most modern in Alaska. The concrete floor of the plant is supported by pilings—as is the entire complex—to avoid damage to, or trouble from, the permafrost.

The indoor life at Prudhoe Bay is devoid of liquor and women. They are not permitted here. But food that produces body heat to counteract the cold is plentiful everywhere in the facility. Fresh oranges, apples, bananas, and grapes are heaped on a stand in the lobby and recreation areas. Coffee, tea, cookies, candy, and nuts are always available. Meals are so hearty that every man working at Prudhoe eventually faces a weight problem.

The Prudhoe crews have access to billiards, shuffleboard, Ping-pong, and various exercise machines. They also have a well-stocked library, a four-bed dispensary, and a movie-projection room. At high noon on one of the shortest days of the year, a lone workman from the night shift lay propped against a chair in the darkened projection room, watching a movie. "A man can check out a film anytime he wants and run it for himself," explained Rosenthal. "I'd say our friend felt a strong and understandable desire to see a tropical-based movie." Radio reception is poor at Prudhoe Bay, and music buffs rely mainly on cassettes.

The 35 men in this operations center work seven 12-hour days, then take a week off. Most are married men and return at company expense to their families in places such as Anchorage, Fairbanks, and Barrow. About one-third of the crewmen are Eskimo residents from Barrow.

"Respect best describes our feeling for the cold in which we have to work," said weather-wise Jim Le Clair as he prepared to drive to the edge of the frozen sea where there are enough 60-foot lengths of 48-inch pipe to reach 170 miles. "We use the buddy system, and someone always knows where we are and what we are doing. Every vehicle is equipped with a

two-way radio. Recognizing there is damn little margin for error has given us an enviable safety record."

Security Blanket

During the nearly constant severe winter cold, vehicles are always kept idling. One of the largest buildings in the complex is a heated garage for storage of vehicles not in use. The security blanket for the men who hold this fort on the frozen edge of the continent is a twin-engine airplane. It is kept in a heated hangar, ready to fly an injured or sick man to a Fairbanks or Anchorage hospital on a moment's notice. Arco and Exxon own, maintain, and operate their own 5,000-foot airstrip, and landing is by invitation only. Drifting snow is the major problem faced by Le Clair's crews as they work to keep the road network and airstrip clear.

"The airstrip has first priority," says Le Clair. "We must have it always operational for our supplies and mail and just in case we have an emergency. Its use is vital if we are going to hold the fort."

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The National Observer

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Nixon Orders Maximum Effort on Alaska Pipeline

The New York Times

SAN CLEMENTE, Calif., April 5—President Nixon today ordered a maximum effort by the Administration to push through Congress legislation necessary for the construction of the Alaska pipeline.

Speaking through his Secretary of the Interior, Rogers C. B. Morton, Mr. Nixon rejected a frequently proposed alternative route that would bring the oil from Alaska's North Slope across Canada to the American Middle West.

The Secretary reported at a subsequent news conference that Mr. Nixon had said "He wanted me to go all out working with the Congress and with the other agencies involved in pursuing the construction of the trans-Alaska pipeline, which he feels is vital in the national interest."

A target of environmentalists since its inception, the pipeline has been delayed by recent court decisions.

Last year, a Federal court ruled that the Government had met the environmental objections to the project. But in February, the Court of Appeals in Washington reversed that decision, not on environmental but legislative grounds.

The appeals court held that under the Mineral Leasing Act, no right of way wider than 54 feet could be granted, which

was inadequate for the proposed pipeline. Last Monday, the Supreme Court let the appeals court's decision stand by refusing to review it.

What the Administration now seeks, Mr. Morton said, is either a modification of the limit in the Mineral Leasing Act of 1920 to permit wider rights of way, or a new clause in the Natural Resource Lands Act permitting the Secretary of the Interior more flexibility in granting rights of way.

Mr. Morton predicted that Congress would approve one measure or the other by the end of the summer. But then, he added, a new series of court tests on the environmental question could be expected, perhaps lasting for a year.

Allowing for construction time, the pipeline could thus be completed no sooner than late 1977 or early 1978.

Mr. Morton linked his case for the pipeline to the energy crisis, asserting that if it were not built, the United States would be forced to import enormous quantities of oil, since the North Slope was expected to supply 12 per cent of the petroleum needs of the United States by 1985.

He said that President Nixon's energy message, would be ready in mid-April.

He also argued for the pipeline on the ground that it was needed to help redress the United States balance of payments. Not to utilize the North

Slope oil, he said, would force the nation to spend overseas \$8-million a day at current prices, or about \$2.9-billion a year.

Mr. Morton released at the news conference the text of a letter to Congressmen who had inquired about the feasibility of the Canadian route.

In it and in his responses to questions, he made a series of arguments against the Canadian alternative, including the following main points:

It would have a "tremendous" impact on "the very tender, environment of the

Arctic" because it would be four times as long as the Alaskan line; it would have to cross 12 major rivers; it would take twice as long to build—perhaps as long as eight years.

Also, since the Canadians would insist on 51 per cent ownership, it would be "almost impossible to finance," and since they would want about half the capacity for Canadian markets, it would be uneconomical for Americans.

Mr. Morton also said that the Canadian route would cost \$10-billion as opposed to \$3-billion for the Alaskan.

MUSK-OX HERD HELPS ESKIMOS IN QUEBEC

FORT CHIMO, Quebec (AP) — A herd of some 30 woolly musk-ox roam near here, eating grass and earning more than \$2,000 each a year.

The animals, a species dating back to the Ice Age, were brought to this village on the shore of Ungava Bay in 1967 from Ellesmere Island in the Arctic by the Quebec resources development office.

The heavy, high-quality wool that protects them from extremely low temperatures has become a part of the economy of this tiny Eskimo settlement.

Every year five or six pounds of down is taken from each animal. Each ounce of that down may be made into a piece

of clothing that sells for about \$35. Some of the Eskimos earn their living by knitting the wool.

Dr. Jules Bourque, veterinarian in charge of the animals, said that several people have expressed an interest in raising musk-ox, but none of this herd is for sale.

He has refused an offer of \$18,000 for a male and female. "You can't sell a pair for that price when a single one is worth \$1-million."

In 1967, 11 musk-ox from the Ellesmere herd, aged three to four months, were installed on a farm laid out for them on the site of nearby Old Fort Chimo. The animals found it difficult to adapt to their new home and three females died shortly after their arrival.

But now all is going well, Dr. Bourque said.

Not Always Happier Lives for Canada's Natives

By WILLIAM BORDERS

The New York Times

RESOLUTE, Northwest Territories, April 5—Peter Lazarus Paniloo, a 35-year-old Eskimo who grew up in a drafty sod house covered with snow, sat in his warm modern kitchen the other day, sipping tea and playing with his infant son.

"Life is much, much easier for me than it was for my father," he

The Talk of the Canadian North mused, glancing around the bright green prefabricated house that the Canadian Government has provided him. "But now we also have problems that my father did not have. So much has changed so quickly."

Mr. Paniloo, who earns \$700 a month as a school janitor, still sometimes hunts caribou and seals, as his ancestors did, but he goes to the hunt in a snowmobile instead of a dog sled, and although he still lives in one of the world's most northern communities, he can talk to people anywhere on his new telephone.

The abrupt change that is sweeping across Canada's vast, frozen North is dramatically reflected in the lives of native people like Mr. Paniloo and his neighbors in this Arctic village 2,000 miles north of Minneapolis.

But it is evident as well in the lives of the white men who are streaming up here to take control, and in the face of the land itself — a bleak wilderness suddenly yielding to paved roads and airport runways, and dotted with stark new towns.

This barren land with its long, dark winters is still brutally inhospitable, but its people, no longer prisoners of the harsh weather, do not starve anymore. Their sense of isolation is still acute, but a communications satellite that the Government launched in November now beams "Sesame Street" and Archie Bunker into villages surrounded by frozen tundra.

The Yukon and the Northwest Territories, covering nearly half as much area as the United States, have been part of a dream of generations of Canadians who felt that some day this land would be the country's new frontier. Now, spurred by indications that the land and water here cover huge reserves of oil and gas, the dream of devel-

opment is suddenly coming true, with mixed effect.

Prime Minister Pierre Elliott Trudeau has begun talking of a Canada stretching "from sea to sea to sea," and nationalists weary of dependence on the United States are eagerly looking in the opposite direction for a change.

They point out that high Arctic outposts like Resolute are almost as close to the Soviet Union or Norway as to the United States, and that their development might modify the traditional view of Canada as a narrow strip along the United States border.

In a fast-paced search for oil and gas, millions of dollars are being spent on the Canadian North, and the social cost is high too—venereal disease and alcoholism are up sharply, and the once-proud cultures of native groups here are being lost.

In Frobisher Bay, for example, the spring thaw uncovers layers of trash and garbage thrown into the snow

all winter by residents who no longer care about the area's appearance because the Government owns nearly everything in town. And in Inuvik, 2,000 miles to the West, a long-time white resident said:

"We all used to get along fine, but now there's real hostility between whites and natives and it's getting worse."

One cause of these new strong feelings is the emergence of several militant native organizations, such as the Indian Brotherhood of the Northwest Territories, which is trying to halt development — and particularly the planned construction of a gas pipeline down the Mackenzie River Valley—on the ground that the land still belongs to the Indians.

"Our people are being forced off the land they know and love, and the greedy white man's getting all the gravy," said James Wah-Shee, the 27-year-old president of the organization. "We are finally aware of what

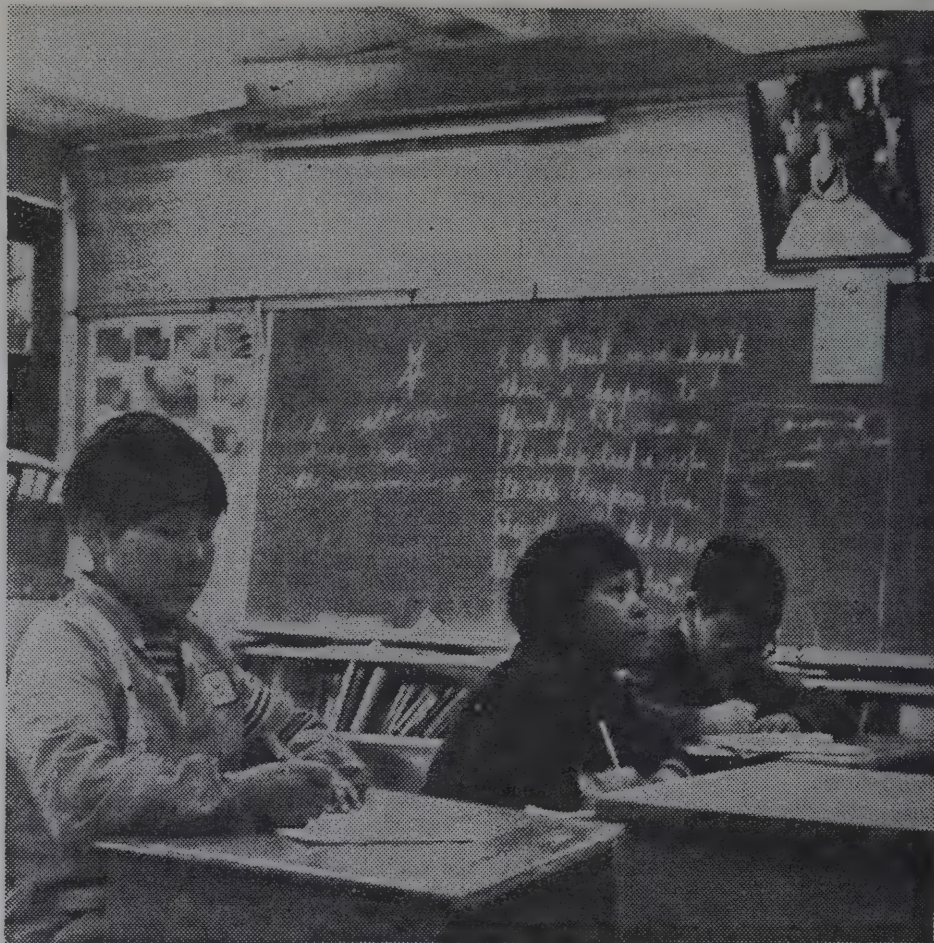
the hell's going on and we mean to stop it."

White resentment at statements like that is heightened by the fact that Mr. Wah-Shee's group is entirely supported by the Canadian Government, which gave it \$200,000 last year.

There is also bitterness about the increasing cost of public welfare, which is as popular a scapegoat in this wilderness as in urban America.

Since not many white people were born in the North and the ones who are here have usually come for specific jobs, most of the welfare recipients are Eskimos or Indians. Government officials decline to estimate the number, but it is widely believed that almost any native who wants money from the Government can get it.

"They're supposed to take a job first," explained an administrator in Frobisher Bay. "But if all a man can do is hunt caribou and there aren't any around because he's left



The New York Times/William Borders

Eskimo children at a reading class in Resolute, Northwest Territories. Queen Elizabeth II, the British monarch who is also Queen of Canada, is depicted in a photo on the wall.



The New York Times/April 21, 1973

The development of the Yukon and the Northwest Territories is having mixed effect on people.

the rural life and moved into town, what do I do?"

A few decades ago, most Canadian Eskimos and many of the Indians led nomadic lives, trapping, hunting and fishing and living in tents or igloos. Now almost all of them live in communities like this one — rows of identical one-story government houses clustered around an elementary school and a store.

The change within one generation, as abrupt as any on earth, has attracted such a flood of scholars here that in a popular joke one Eskimo asks another: "Who's your anthropologist?"

Having flocked into the settlement, with official encouragement, some of the native people make boots or parkas or carvings, which the Government sells enthusiastically. But many of them have nothing to do, and alcohol is a convenient time-killer.

The stores that sell liquor also dispense warnings prepared by Alcoholics Anonymous, and Stuart M. Hodgson, the Commissioner, or governor, of the Northwest Territories, makes a point of never setting a foot in a bar, as an example.

But more than 10 per cent of the deaths last year were attributed to accidents or violence related to drinking, and grotesquely drunken natives, both men and women, are a familiar part of the street scene in any of the larger northern towns.

In a rugged land where for centuries proud self-reliance was the rule, the Government has become the dominant force, and welfare has be-

come a way of life.

Doug Wilkinson, a writer who has spent 25 years in the North, thinks that an important part of the native problem is that "in many cases there is no longer any central fact to their lives. Materially, life is much better for them now, but too often the sense of central purpose has been removed, leaving a vacuum."

The oil-exploration companies have hired some natives to work on their rigs, but often executives consider it more efficient to fly in trained workers from outside.

In the Mackenzie River valley, where the Government is building several hundred miles of highway, a number of local laborers were put on the payroll last winter in a special effort known as "hire North," but most of them were willing to spend only a few weeks on the road crews before returning home.

To help the native people find their way into the cash economy and into the modern civilization that is overtaking their land, the Government has doubled Indian and Eskimo school enrollment in the last 10 years, and now almost every child in the North receives at least a primary education, usually in his home community.

To attend high school, rural children must leave home and live in one of eight student residences spread out over thousands of miles, and often that move begins the breakdown of family ties that the people used to cherish.

For the seven children of Mr. Paniloo, the elementary school janitor here in Resolute, the critical phase of that

CANADA ACQUIRES RADIO SATELLITE

Anik 2 Will Also Provide a Domestic Link for U.S.

By JOHN NOBLE WILFORD

The New York Times

April 21 —

A Canadian communications satellite was launched from Cape Kennedy, Fla., last night to serve not only Canada but also to provide the first domestic satellite communications for the United States.

The spacecraft, Anik 2, was blasted into space by a Thor-Delta rocket at 6:47 P.M. The 1,250-pound satellite was built by Telesat Canada, a private consortium, and launched under contract by the National Aeronautics and Space Administration.

Although Anik 2 is primarily for Canadian communications, two of its 12 channels have been leased by RCA Global Communications, Inc., and RCA Alaska Communications, Inc. Service is expected to begin in August, pending formal approval by the Federal Communications Commission.

The service will handle certain voice and data messages and television traffic between the East and West Coasts of

process is just beginning, and he is uncertain about the future. Timothy, his oldest child, is 16 and so he now lives at the youth residence in Frobisher Bay, 1,000 miles southeast of here.

"The others will go away for school when their time comes, and they should because there are many things that one must learn these days," Mr. Paniloo said, as he pointed out the children in a well-thumbed family photograph album.

"Then after they have learned those things, I hope they will come back to Resolute for our kind of life, but you cannot be sure," he added.

A few days later, in Frobisher Bay, Timothy Paniloo took a different look at the same future.

"I'm certainly going back this year for a visit, and I hope maybe to get me a polar bear," the boy said. "But as for living in Resolute all the time, well maybe. But I think I might be happier in the city."

the United States and between both coasts and Alaska.

The lower costs of satellite communications should open the way for many more live television transmissions to Alaska, RCA officials said.

"We estimate that the satellite system will permit the cost of coast-to-coast private line voice service to be reduced by more than 20 per cent," said Howard R. Hawkins, RCA executive vice president.

Ground stations for the service are planned in the New York area, near San Francisco and near Los Angeles and at Anchorage and Juneau in Alaska. Such facilities are expected to cost \$7-million. Rental cost of the Anik 2 channels is \$2.7-million annually.

Anik is the Eskimo word for brother. A similar satellite, Anik 1, was launched last November and is already providing a communications link between the east and west, the south and Arctic regions of Canada. Anik 2 is expected to serve as a back-up satellite and allow for expanded service.

When Anik 1 was placed in an orbit 22,300 above the earth's Equator, it became the world's first domestic communications satellite. All others were limited to intercontinental service, particularly between the East Coast of the United States and Western Europe.

The United States' entry into domestic satellite communications service was held up by years of controversy over who would be permitted to build and operate such satellites. Last December, the F.C.C. issued its final policy decision in which it was agreed that any "qualified entity" could file an application.

Besides RCA, American Telephone and Telegraph, Western Union, American Satellite Company and two consortiums—General Telephone and Electronics and Hughes Aircraft and a group consisting of Lockheed, Comsat Corporation and Microwave Communications, Inc.—have filed for construction permits.

Their satellites are not expected to be ready before 1975. Not until A.T.&T.'s satellites are operational would it be possible for ordinary domestic telephone calls to be made by satellite.

Call Surprises

MONTREAL (AP) — Robert Scrivener, president of Bell Canada, said he was surprised by a phone call from a friend 40 feet under water in the arctic. Researcher Dr. Joseph MacInnis was experimenting with the new communications satellite Anik.

Soviet Hails Arctic Convoy for Icebreaking

By THEODORE SHABAD

The New York Times

MOSCOW, Feb. 3 — The Soviet Union has honored an Arctic convoy of four ships, escorted by five icebreakers, that smashed its way through the ice of the north Siberian seaway as late as the month of January. It was the longest extension of the shipping season in the history of the Arctic sea route.

At a ceremony in the port of Murmansk, high Government awards and decorations were handed out yesterday to captains and crew members who had distinguished themselves in the crossing from the mouth of the Yenisei.

The 15-day struggle of the convoy to smash and carve a lane through the ice of the Arctic Ocean highlights the increasing use that the Russians are making of the hazardous route, which is normally open only from July to November.

However, the Soviet authorities have sought to extend the shipping season from year to year by using a fleet of modern icebreakers, headed by the nuclear icebreaker Lenin, which has been in service on the seaway since 1960.

About five years ago, the Soviet Union made a widely publicized offer to open its northern sea route between Europe and Asia to vessels of all foreign countries. Under the plan, foreign ships would have been convoyed through the seaway by icebreakers for a fee.

The offer appeared attractive because the use of the northern seaway would have shortened the shipping route between northern Europe and the Far East, for Japanese vessels for example, by several thousand miles compared with the Suez Canal route, which was then open. However, the plan did not gain wide acceptance, apparently because ship operators found it uneconomical.

Domestic uses of the seaway along the northern coast of Siberia have long been limited to supply vessels for the isolated outposts along the route and for timber exports from port at Igarka, on the lower Yenisei River.

In recent years, the seaway has gained in significance with the expansion of the large metal-producing complex at Norilsk, one of the world's northernmost



The New York Times/Feb. 4, 1973

Soviet vessels sailed from Dudinka (1) to Murmansk (2)

mining centers, supplying nickel, copper, cobalt and platinum.

A rapid development of additional mining capacity at Norilsk has not been matched by the construction of new local smelters, and the surplus ore has had to be shipped to smelters in the Murmansk area for processing.

It was such a cargo that the four freighters in the unusual January convoy were carrying when they left the port of Dudinka on the lower Yenisei on Jan. 12. Dudinka is the loading point for the ore and metals output of Norilsk, with which it is linked by a 70-mile railroad.

The freighters had reached Dudinka just before the new year and, having loaded their cargo, were to attempt the return trip to Murmansk with the help of the five icebreakers, including the 16,000-ton Lenin. The trip between Dudinka and Murmansk normally takes five days during the ice-free season.

The convoy was guided by reconnaissance planes that were supposed to report conditions ahead and suggest the best route. However, the Arctic night and frequent overcast made aerial observations difficult.

It took the convoy nearly two weeks to cover the 800 miles through the ice-covered Kara Sea.

When it finally reached the strait separating the Kara Sea from the normally ice-free Barents Sea, aerial spotters recommended that it try to make its way through the narrow strait known as Yugorski Shar, between Vaigach Island and the mainland. The usual shipping lane passes through the wider Kara Gates north of Vaigach Island.

Two of the convoy's con-

ventional icebreakers, the Kiev and the Murmansk, each developing 26,000 horsepower, were sent ahead to carve a lane through the narrow strait. It took them 22 hours to batter their way through the 27-mile-long passage.

The convoy emerged last Saturday, into the Barents Sea, which is normally kept open to shipping by a warm current from the North Atlantic, and finally reached its destination, the port at Murmansk, on Monday.

Having gradually extended the shipping season along the Siberian seaway until January, Soviet shipping officials are now reported to be setting their sights even higher.

They are looking to the use of the Arctic route until February and March and hope ultimately to have enough modern icebreakers to keep the seaway open all year round, at least in its western portion.

Victor H. Czegka, Byrd Aide On 2 Antarctic Expeditions

IPSWICH, Mass., Feb. 21 (AP)—Victor H. Czegka, who served in both of Adm. Richard E. Byrd's Antarctic expeditions, died here Sunday at his home. He was 92 years old.

Mr. Czegka, at Admiral Byrd's request, designed and developed an insulated house that was used in the Antarctic expeditions. He was chief machinist for the first expedition in 1929, and general manager of the second venture in 1934-5.

Mr. Czegka, who had served in the Marine Corps, won more than 20 decorations, including the Navy Cross.

He leaves his wife, Katherine, and a daughter, Mrs. David C. Waite.

20,000-Year-Old Dwelling Is Discovered in Siberia

MOSCOW, April 14 (UPI)—Archeologists have discovered a dwelling built 20,000 years ago by Paleolithic man from mammoth bones, the Soviet press agency Tass has reported.

The archeologists said the structure, found near Achinsk, Siberia, had many features in common with similar ancient dwellings discovered by other archeologists on the River Don in central Russia.

The Siberian find indicated Siberia was originally populated by men coming not only from the south but also from Europe, the archeologists said.

4 Rockets to Study Aurora

CHURCHILL, Man., Feb. 2 (AP)—Four rockets designed to study the aurora borealis were successfully launched early today in northern Manitoba. J. T. Faulkner, superintendent of the Churchill Research Range, said that three of the rockets had been launched from Churchill and a fourth from Gillam, about 174 miles south. Two rockets were launched for the National Research Council of Canada and two for the U.S. National Aeronautics and Space Administration. The two agencies are cooperating in the study.

Roger Hawthorne, Reporter, Covered Byrd in Antarctic

POCASSET, Mass., May 14 (AP) — Roger Hawthorne, a newsman for whom Rear Adm. Richard E. Byrd named a mountain in the Antarctic, died Saturday at Barnstable County Hospital. He was 68 years old.

A series of stories Mr. Hawthorne had written on the Antarctic while he was an Associated Press correspondent in Washington led to Admiral Byrd's request that he join the 1939 expedition on the U.S.S. Bear out of Boston to Little America.

Mr. Hawthorne accompanied Admiral Byrd as a field representative for the United States Antarctic Service on that trip and again in 1941. The admiral named a 3,400-foot-high peak on Thurston Island in the Amundsen Sea Mount Hawthorne.

A graduate of Bowdoin College, Mr. Hawthorne moved to Cape Cod in 1960 and was a feature writer for The Cape Cod Standard-Times until 1966.

Thick Ice Crust Imperils 370,000 Reindeer in Siberia

By THEODORE SHABAD

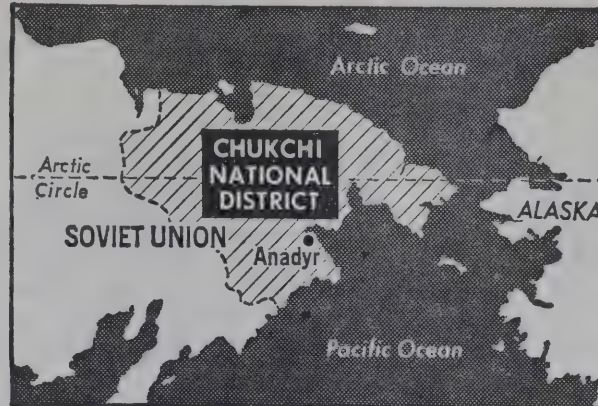
The New York Times

MOSCOW, Jan. 18—Soviet authorities have declared a state of emergency in North-east Siberia, opposite Alaska, after a winter storm covered tundra grazing grounds with a thick ice crust, depriving 370,000 reindeer of fodder.

The reindeer are a key element of the northern economy, supplying Siberian tribes with meat, milk, skins and draft animals. Much of the transportation along the tundra coast of the Arctic Ocean depends on reindeer-drawn sleds in winter and pack reindeer in summer.

All available means of transport, from helicopters and planes to dog sleds, have been pressed into service to take feed, salt and seal oil to the endangered herds and to find pasture lands that may have escaped the ice.

The potentially disastrous situation, which apparently came about within the last week because of a sudden drop of temperature after an unseasonal thaw, affected half of the Chukchi National District, an ethnic territory inhabited by the 14,000-member Chukchi tribe—related to the Eskimos—



The New York Times/Jan. 19, 1973

for whom reindeer raising is the basis of existence.

The herds deprived of their customary reindeer moss, which they usually reach in winter by scraping the snow away with their hoofs, represent about half the animals in the Chukchi District and 15 per cent of the Soviet Union's total reindeer.

Details of the situation were disclosed tonight in the government daily Izvestia in a dispatch from Anadyr, a northern outpost town of 8,000 that functions as the administrative seat of the Chukchi District.

According to the account, an

unusual warm front moving out of the Pacific into the snow-covered Chukchi Peninsula had raised temperatures in the normally icy-cold region to 40 degrees Fahrenheit, converting vast areas into a virtual sea of slush.

This was followed by a cold front that sent temperatures plummeting within a few hours and glazed about one-half of the Chukchi District with a thick crust of ice.

About 20 reindeer farms, both collectives and state-owned enterprises, were affect-

ed by the storm, and emergency services were promptly set in motion, Izvestia reported.

In addition to delivering emergency supplies to the herders, the relief effort was designed to guide the animals to areas, such as north-facing slopes, that had escaped the thaw and were therefore not covered with glaze.

One Chukchi herder, Ivan Arento, who bears the title of Hero of Socialist Labor, the Soviet Union's highest civilian honor, was credited with having saved his entire herd of 3,000 animals by driving them to new grazing land.

By coincidence, the ice storm struck the region as Soviet television carried an unusual two-part film on the life of the Chukchi people in the north-east Siberian tundra. The film, called "The Most Beautiful Ships," was based on a story by Yuri Rytkheu, 42-year-old Chukchi writer, and depicted with apparent realism the day-to-day existence of the nomadic herders in their harsh northern environment.

First Nuclear Power Station In Arctic Is Opened by Soviet

The New York Times

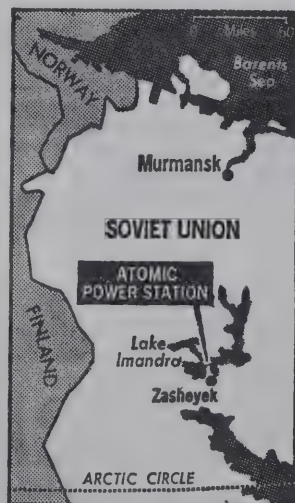
MOSCOW, June 24—The Soviet Union announced today the start of operation of the world's first nuclear station within the Arctic Circle.

The power plant, in the Kola Peninsula of northern European Russia, is designed to bolster the electricity supply of a mining region that is rich in metal resources and other valuable minerals but lacks coal and other fuels.

The Soviet nuclear-power program, which is to add six to eight million kilowatts of generating capacity during the current Five-Year Plan (1971-75), has not drawn protests from scientific and environmental groups such as have posed a problem for atomic-power advocates in the United States.

Economic planners, after a slow start in the nineteen-sixties, appear to have decided that nuclear power stations are safe and economical, and this policy has not been questioned publicly.

The industrial daily Sotsialisticheskaya Industriya reported today that the first of two 440,000-kilowatt reactors



The New York Times/June 25, 1973

of the Kola station had achieved criticality. This means that it is capable of sustaining the chain reaction of the nuclear fuel, uranium 235.

The paper added that after tests of the operation, power would start flowing "in a few days" into the system serving the mines and industries of the Murmansk region, which lies on the peninsula.

The second 440,000-kilowatt unit is being installed and is scheduled to go into operation before 1975, the paper added.

About 80 per cent of the electric power required for the area's industries has been derived from the area's water-power potential, which is rapidly approaching its limit. The construction of the atomic power station was found to be a more economical source of additional energy than the long hauls of coal or oil that would be needed to supply fuel-burning electric plants.

The Kola station is just north of the town of Zasheyek, where a small peninsula juts into Lake Imandra. Nuclear power stations require an ample supply of water to generate the steam that drives the power turbines.

The new nuclear plant is to be linked by a high-voltage transmission line, now under construction, with the Leningrad area, where an atomic station is also being built.

The Kola station is of the conventional water-reactor type, used in most of the world's commercial nuclear power plants. A Soviet breeder reactor, of the type that produces more nuclear fuel than it consumes, started up last December and is still undergoing tests.

Arctic Research

MOSCOW, April 18 (AP)—Scientists at the Soviet weather station "North Pole 19" have ended their research on arctic movement, the Soviet news agency Tass reported. The ice island on which the station was situated drifted 3½ years and almost 4,500 miles, the agency said.

Russians Said to Be Using Boots Warmed by a Battery

MOSCOW (UPI) — Boots warmed by a small battery are being produced by a footwear factory in Kimry, near Moscow, for persons working in the Soviet Union's extreme north, according to Tass, the official Soviet press agency.

Tass said the boots keep feet warm even at temperatures as low as minus 58 degrees Fahrenheit.

Tractor drivers and excavator operators have the option of attaching the boots to the 12-volt power plant of their vehicle.

Permafrost

What It Is— What It Does

By Stanton H. Patty

THE SEATTLE TIMES

WHAT IS THIS STUFF they call permafrost?

The term, of little concern to anyone but residents of the Far North and a small band of Arctic scientists until recently, is being tossed around by all sorts of folk these days because of the Alaska oil boom.

Even some instant experts on the conservation front who have little or no understanding of the Northland have added it to their automatic glossary. They treat permafrost as a new discovery and often are unaware of the engineering studies that are helping man to cope with this annoying problem.

There is reason for concern. Hot oil flowing through a giant pipeline buried in permafrost could produce a disaster without the proper safeguards. The United States government knows it. So do the oil companies. They are working toward solutions.

"Permafrost" is a word coined by S. W. Muller, a geologist, in a technical paper for the United States Geological Survey back in 1943.

What it means is perennially frozen ground.

Surprisingly, permafrost underlies about a fifth of the world's land area — including 85 per cent of Alaska and half of both Canada and the Soviet Union.

It extends from a depth of just a few feet in the southern part of Alaska's permafrost zones to more than 1,300 feet in parts of the North Slope where great oil fields are being developed. Permafrost is continuous in some places; sporadic in others.

Technically speaking, the Geological Survey says, permafrost forms when the mean annual air temperature is low

enough to maintain a mean annual ground-surface temperature below 32 degrees.

Because the formation of permafrost depends on temperatures at the surface of the ground, the thickness and area distribution of permafrost are affected directly by natural surface features such as bodies of water or vegetation. These features can act as a heat source or as insulation.

That is why so many ecologists are worried about what the geophysical crews searching for oil and the drilling companies may do to the tundra cover.

This surface vegetation is all that prevents permafrost from melting to problem depths. If this thin layer of insulation is disturbed (and it has been at times), the result is trouble.

There has been plenty of visible evidence in Alaska for many years to demonstrate what happens when this equilibrium is upset.

Thawing permafrost has displaced tracks and bridges of the Alaska Railroad, resulting in costly construction and maintenance headaches. The same is true for poorly built highways, where thawing and frost heaving twist bridges and can turn roadways into quagmires.

Heated buildings, melting the permafrost below, soon slump or lean at tipsy angles. In some communities the structures have to be blocked or jacked up periodically to maintain level positions. Tourists may consider the tilted homes "quaint," but it is a vexing problem for the residents.

Alaska has had some permafrost experts working in the field for many years, men such as Dr. Troy L. Pewe, formerly of the University of Alaska, and Dr. Max C.

Brewer, director of the Naval Arctic Research Laboratory.

However, most of the earliest research was carried out by the Soviet Union.

According to the Geological Survey, Russia demonstrated years ago that major development can take place in the Arctic by building major cities successfully in permafrost regions. Since 1938, the Soviet government has required that thorough surveys of permafrost conditions be made according to a prescribed plan before any building could be erected on permafrost.

Nowadays, America is learning fast, too.

Oil companies on the North Slope are mounting drilling rigs, highways and airstrips atop thick pads of gravel to provide insulation for the permafrost.

The Naval Arctic Research Laboratory found a simple solution for its \$2 million headquarters dedicated last year at Barrow. The big building rests on 557 piles placed 15 feet down into the permafrost — leaving an air space to prevent thawing of the permafrost and using the permafrost itself for the foundation to anchor the piling.

Best of all, the oil men and others are finding that operating methods that least damage the environment are saving them both money and public-relations controversies.

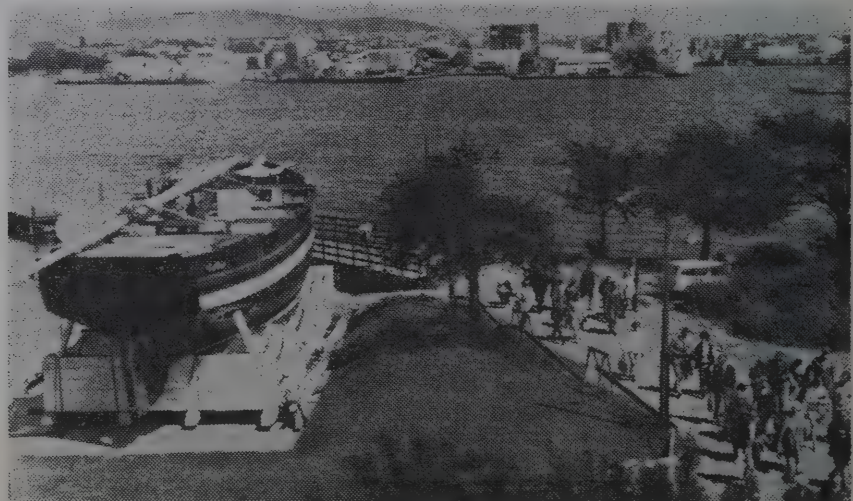
"The proper way to do it is the cheapest way as well," Dr. Brewer said.

Meanwhile, there never has been any mystery about permafrost for the Eskimos. They long have used it for their refrigerators. But this is changing, too.

The modern Eskimo is converting to electric freezers as power becomes available in the remote villages.

The Gjoa Home at Last

The Gjoa, explorer Roald Amundsen's ship that lodged so long in Golden Gate Park, has returned to Norway where she is perched on a concrete slab at the edge of the sea across the bay from Oslo. Workers are preparing to put up the rigging as soon as the heavy winter rains taper off. By autumn, they hope, the ship will be as shipshape as she can be made to be.



San Francisco Chronicle

By A. E. Pedersen

British Antarctic Territories Show Explorers On Definitives

The British Antarctic Territory has released 15 definitives on Feb. 14, reports Stan Gib, Hempstead, N.Y. for the Crown Agents Bureau.

The set features explorers of Antarctica and the ships or planes used in their adventures.

Values and explorers include ½-pence, James Cook and the Resolution; 1p, Thaddeus von Bellingshausen, Vostok; 1½p, James Weddell, Jane; 2p, John Biscoe, Tula; 2½p, J.S.C. Dumont d'Urville, Astrolabe; 3p, James Clark Ross, Erebus; and 4p, C. A. Larsen, Jason.

Also, 5p, Adrien de Gerlache, Belgica; 6p, Otto Nordenskjöld, Antarctic; 7½p, W. S. Bruce, Scotia; 10p, Jean Baptiste Charcot, Pourquoi Pas?; 15p, Ernest Shackleton, Endurance; 25p, Hubert Wilkins, San Francisco; 50p, Lincoln Ellsworth, Polar Star; and 1-pound, John Rymill, Penola.

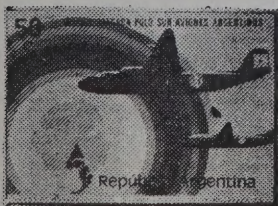
All are ships except the "San Francisco" shown on the 25p and the "Polar Star" featured on the 50p, which are airplanes.

The designer was Waddington Studio. Printing was lithography in a vertical format on C. A. block watermarked paper in panes of 25 subjects by Questa Colour Security Printers.

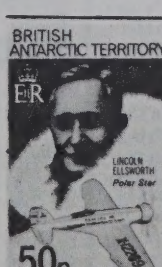
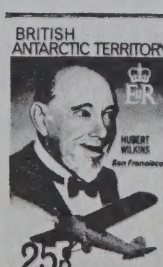
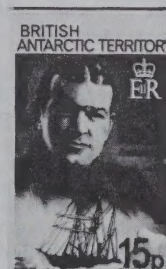
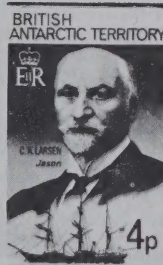
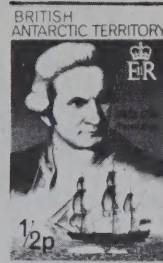


Walrus

On Feb. 15 Greenland will issue a 10-kroner stamp featuring walrus, report postal officials. It was designed by Jens Rosing and engraved by Czeslaw Slania and will be printed in brown in sheets of 50 subjects.



The 50c salute to the nation's first flight to the South Pole features two Douglas DC3 planes with a representation of a map of Antarctica with Argentina's claim indicated.



Operation Deep Freeze 1974 begins in October of this year and with it the cacheting and cancellation of Antarctic covers on a daily basis in order that they can be placed back in the U.S. mail system for faster return.

The announcement by officials of U. S. Naval Support Antarctica says that the servicing and posting of covers as received contrasts with previous years when philatelic mail was held in the Antarctic and processed by the winter-over crews.

Cancellation of covers is expected to start in mid-October and conclude by the end of February for the 1974 program. Summer in the Antarctic starts Dec. 22 and winter on June 22.

Due to a reduction in the number of aircraft available for flights to and from the Antarctic during Operation Deep Freeze 1974, cover servicing will be limited to two per person.

Collectors have the option of sending two covers to one of the two stations processing mail, or sending one cover to each of the facilities, a Naval spokesman told Linn's. The announcement said covers must be clearly marked in the lower left hand front corner with either "McMurdo Station" or "South Pole Station" and sent to one or both of the facilities as follows:

Philatelic Mail Clerk, McMurdo Station, U. S. Naval Support Force, Antarctica c/o FPO San Francisco, Calif. 96692, or,

Philatelic Mail Orderly, Amundsen-Scott South Pole Station, U. S. Naval Support Force, Antarctica c/o FPO San Francisco, Calif. 96692.

The current Australian Antarctic Territory stamps issued in 1966 will be replaced this year by a new series picturing explorers' aircraft and the food chains which link plankton and shrimp with seals, birds and whales. The series will appear in August or September to enable collectors to have first day covers dispatched to Antarctic post offices with the annual relief ships.



GREENLAND — April 16: Queen Margrethe, 10 ore (green), 60o (brown), portrait of the Queen of Denmark. Designer-engraver, Cz. Slania; recess, Danish Post Office Printing Office, Copenhagen.

Adelphi Prof To Make Polar Fossil Foray

Dr. Robert M. West of West Hempstead, assistant professor of biology at Adelphi University, Garden City, will be one of a four-member team of scientists going to the Canadian Arctic this summer.

The expedition is financed by grants totaling about \$20,000 and the purpose of the trip will be to hunt for mammalian fossils 40 to 65 million years old. The study might help support the theory that a land link between eastern North America and western Europe once existed in that area.

West and Dr. Mary R. Dawson, curator of fossils of the Carnegie Museum in Pittsburgh are investigators for the project. Other team members will be Howard Hutchison of the Museum of Paleontology, University of California at Berkeley, and Paul Raemakers of the University of Toronto.

Funding for the expedition is a \$12,683 grant from the National Geographic Society in Washington. The project has also received \$3,000 from the Carnegie Museum in Pittsburgh; 45 hours of flying time and two radios from the Polar Continental Shelf Project of the Canadian Department of Energy, Mines and Resources. The salaries, equipment and supplies come from the Royal Ontario Museum in Toronto.

Such evidence would mean that a North Atlantic connection existed before the North Pacific connection. "Within the last ten years, it has been hypothesized that a land route existed in the North Atlantic area, preceding that in the North Pacific by 15 million years," West said.

Land connections that permitted animals to pass between the two continents is suggested by the close resemblance between early Cenozoic fossils found in western Europe and those of the same age found in North America.

"About 60 million years ago, Greenland separated from the Eurasian plate and established a northern contact with North America. About 49 million years ago, the Norwegian-Greenland Sea opened and separated the North American and Eurasian crustal blocks, thus terminating the terrestrial connection," West said.

The team hopes to find fossil evidence of the last animals that were held in common by North America and Europe in the North Atlantic area. Any fossils they find could provide the most precise evidence yet available of the break in faunal continuity at that

World Group on Whaling Votes Curb on Hunt for One Species

By JULES ARBOSE

The New York Times

LONDON, June 28—The International Whaling Commission approved a moratorium today on the hunting of fin whales in the Antarctic.

The moratorium, in effect, served notice on the two largest whaling nations, the Soviet Union and Japan, that the commission would no longer be a rubber stamp for the needs of their whaling industries.

The Russians and Japanese, who together account for about 85 per cent of the annual whale catch, were the only countries to oppose the resolution. It was sponsored by the United States, whose proposal for a 10-year moratorium on whaling was rejected earlier this week.

The moratorium on the hunting of the fin whale, a typical species ranging up to 80 feet in length, is intended to take effect over the next three years. One of four whales still hunted profitably, its number is estimated to have dropped from 380,000 at the end of World War II to 77,000.

Since the 15-member commission, comprising the principal whaling nations, has no enforcement powers, the Russians and Japanese could continue hunting the fin whale. The commission, set up in 1946 to conserve whale stocks, meets annually to set quotas and provide for the protection of

species near extinction.

"Frankly, I don't know what the Soviet Union and Japan will do," said Inge Rindal, head of the Norwegian delegation, who served as chairman of the annual conference. It opened here Monday to set quotas for the 1973-74 season and will end tomorrow.

"What the decision probably will mean," Mr. Rindal said, "is that the commission's observer scheme will not become effective for expeditions going to the Antarctic."

Observers monitor catches on factory ships and at land stations to insure that member countries do not exceed quotas.

The United States delegation, while disappointed with the rejection of its call for a total moratorium, seemed pleased with the move to stop exploitation of the fin whale.

"Placing the fin whale under a complete moratorium is the most urgent matter before the commission," Robert M. White, head of the delegation, told delegates. He explained that it was "the most seriously depleted of all the species now being killed commercially."

Coupled with the call for a moratorium on hunting the fin whale was a reduction of the quota in the Antarctic from 1,950 to 1,450. Both measures were approved by a vote of 7 to 2, with 5 abstentions. The fin quota in the North Pacific, where the moratorium will not apply, was cut by 100 to 550 for next season.

In all the commission cut quotas for next season's catch by 1,100. This season's catch was estimated at 37,000.

Quotas for the sperm whale remain the same, 13,000 in the Antarctic and 10,000 in the North Pacific. The quota of 5,000 minke, which grows to only 30 feet but has been hunted in recent years following the decline of the big whales, was retained in the Antarctic.

The quota on the sei whale was cut by 500 to 4,500 in the Antarctic but remains at 3,000 in the North Pacific.

The cuts are hardly likely to satisfy conservationists, who have called for a 10-year moratorium in line with a resolution adopted by the United Nations Environmental Conference in Stockholm in 1972. Joan McIntyre, president of Project Jonah, a leading organization campaigning for the end of whaling, dismissed the meeting as a failure. Other observers saw things differently.

"For years, indeed since the commission was created," a Western delegate said, "the commission has essentially been a rubber stamp for what the leading whaling nations were willing to do. Now, in spite of continuous threats of the Japanese and Russians to walk out, a controversial resolution has been passed. The fin moratorium will be seen as a significant test of whether the commission serves the whale industry or serves the world through proper management of its whale resources."

ROBERT CUSHMAN MURPHY

March 21

Naturalist Robert Cushman Murphy, 86, Congressional Medal winner who led expeditions to

study birds and animals throughout the world, died yesterday at his Stony Brook, L. I., home.

Murphy was one of the first to raise his voice against whaling after an Antarctic expedition aboard the whaling brig Daisy in 1912.

Murphy, a native of Brooklyn, became a \$40-a-month aide at the American Museum of Natural History in 1906. He left to become curator of birds at the Brooklyn Museum in 1911 and returned in 1921. He retired in 1955 with the title of emeritus curator of birds.

Murphy was a former president of the National Audubon Society and the author of 12 books. He won the Congressional Medal for his Antarctic service.



Robert
Murphy

Reginald B. Hegarty, 66, Whaling Historian, Is Dead

NEW BEDFORD, Mass., Jan. 19 (AP)—Reginald B. Hegarty, a whaling historian, died yesterday after a long illness. He was 66 years old, and lived in Fairhaven.

Mr. Hegarty, the son of a late New Bedford whaling captain who lost his life at sea, was curator of the Melville Room at the New Bedford Free Public Library. An authority on the history of whaling out of New Bedford, he was the author of several books on the subject, including "New Bedford and American Whaling" and "The Birth of a Whale Ship."

He was responsible for compiling the names of the men who shipped out on whaling vessels and compiled a file showing the location of every whaling log and journal known to exist in public or private hands.

He is survived by his son, William, and a brother, Parnly.

Adm. Charles W. Thomas Dead; Polar Explorer and War Hero

The New York Times

March 10

Rear Adm. Charles W. Thomas, retired Coast Guard polar explorer and ice-breaking expert who captured two German weather stations in Greenland and an armed trawler in World War II, was killed with his wife, Lorinda, in an automobile accident in Ushuaia, Argentina, last Saturday. He was 69 years old and lived in Alton, N. H.

Admiral Thomas, who retired from the Coast Guard in 1957, had been serving as ice pilot and lecturer on the Norwegian passenger motor vessel *Linblad Explorer*, which was making a cruise to Antarctica.

In his book, "Ice Is Where You Find It," published in 1951, he related his adventures in the Arctic and Antarctic. The late Russell Owen, in *The New York Times Book Review*, described him as "an able, modest and daredevil sort of a fellow when in a tight spot."

During World War II, Admiral Thomas commanded the cutter *Northland* on a 1943 expedition to northeast Greenland. He and his crew captured a Nazi weather-radio station and established a United States Naval Station on Jan Mayen Island. He received the Navy Commendation Pendant and Bronze Star.

As commander of the Coast Guard icebreaker *Eastwind* and a northeast Greenland task unit in 1944, Admiral Thomas won the Legion of Merit with Combat V device for a night surprise attack and capture of another German weather-radio station on North Little Kolde Island off the coast of northeast Greenland, in what was said to be the northernmost action of the war. That award also covered his chase and capture of the German armed trawler *Externsteine* in the ice pack.

In 1946-47, Admiral Thomas commanded the Coast Guard icebreaker *Northwind* on Operation High Jump, the forth Adm. Richard E. Byrd expedition to the Antarctic, the subject of the motion picture "The Secret Land." In 1955 he became chief of staff, Antarctic Planning Group, to implement Navy support of the United States committee for the International Geophysical Year programs at the South Pole.

That July Admiral Thomas was named task unit commander during Operation Deep Freeze I. With the *Eastwind* as his flagship, he delivered cargo



U.S. Coast Guard, 1957

Rear Adm. Charles Thomas

for construction of Little America, explored the East Coast of Victoria Land and found the site for the Cape Hallett scientific base.

Admiral Thomas also served as task group commander for Operation Deep Freeze II with the *Northwind* to erect the Cape Hallett base. He also found the site for the Wilkes scientific station on Clark Peninsula and helped install it, and explored a group of uncharted islands northeast of Clark Peninsula.

On his retirement in 1957, Admiral Thomas was named director of Arctic operations for the United States Committee of the Geophysical Year. Later he directed a study of the Arctic basin for the University of Washington served with the Museum of Comparative Zoology at Harvard University and was professor of science at Nathaniel Hawthorne College in New Hampshire.

Admiral Thomas was born on Sept. 3, 1903, in Pasadena, Calif., and graduated from the Coast Guard Academy, New London, Conn., in 1924. In the late nineteen-twenties and thirties; he served on various destroyers and cutters based on the North Atlantic Coast that fought the rum war of that era.

Surviving are a son, Charles Jr.; a daughter, Trina Anne, and a stepson, Dewy Watson.

He continued to be active in his field after retirement and was the author of numerous published articles on sea pollution problems, undersea research and polar navigation.

Long association with Antarctica

April 30

Few New Zealanders have done more to promote interest in the Antarctic and its affairs than Leslie Bowden Quartermain, who died in Wellington at the week-end at the age of 77.

He was New Zealand's leading Antarctic historian, was associated with the New Zealand Antarctic Society for more than 40 years, and edited its internationally-known news bulletin for nearly 20 years.

Mr Quartermain wrote extensively on the early expeditions in the Ross Dependency and when he was 65 led a party which restored the two historic huts occupied by Scott's last expedition at Cape Evans and Shackleton's expedition at Cape Royds.

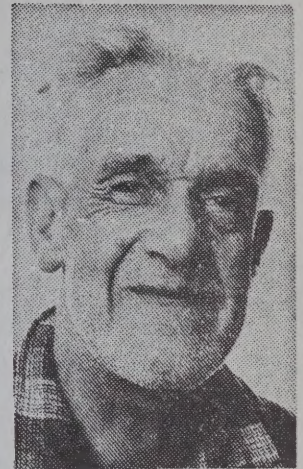
His writings on Antarctica brought him in close touch with many explorers and scientists from the early expeditions through to the present time. Among his friends were men of Scott's 1901-1904 expedition, and Shackleton's expedition, and the modern leaders such as Dr Laurence Gould and Paul-Emile Victor.

Mr Quartermain was born in Hororata and educated at Christchurch Boys' High School and Canterbury University College where he gained his M.A. After eight years at Christchurch Boys' High School as an assistant master, he became head of the English department at Wellington College from 1930 to 1956.

As a schoolboy, Mr Quartermain began his interest in the Antarctic. He watched the return of Shackleton's *Nimrod* to Lyttelton in 1909, heard Shackleton's lecture, and watched the departure of Scott's last expedition in 1910.

In Wellington he became one of the foundation members of the New Zealand Antarctic Society and was elected to the first council in 1933. He was president of the society from 1957 to 1959, and was also one of its patrons.

Mr Quartermain suggested in 1950 that the society publish a periodic news-sheet for members. The "Antarctic News Bulletin" began as a two-page cyclostyled publication; since 1956 it has become a magazine which circulates in many countries.



Mr Quartermain retired as editor in 1968.

When he retired from teaching, Mr Quartermain was appointed information officer for the Antarctic Division of the Department of Scientific and Industrial Research, a position he held from 1959 to 1969. He visited the Antarctic three times, first as the guest of the, United States Navy's Antarctic Support Force, second as leader of the hut restoration party, and in 1968 as the guest of the Antarctic Division. He was 73 when he visited the South Pole Station.

Mr Quartermain's Antarctic publications included booklets for schools, "Into the Antarctic" and "Down to the Ice," and the books "Two Huts in the Antarctic," "South from New Zealand," and "The Ross Dependency in Pictures." His major works were "South to the Pole," a history of exploration in the Ross Dependency from the time of Captain Cook, and "New Zealand in the Antarctic," a history of New Zealand's association with Antarctic exploration and research.

At the time of his death he was writing a book about lesser-known members of the early expeditions.

In 1967 Mr Quartermain was awarded the M.B.E. for his work as a specialist in Antarctic affairs.

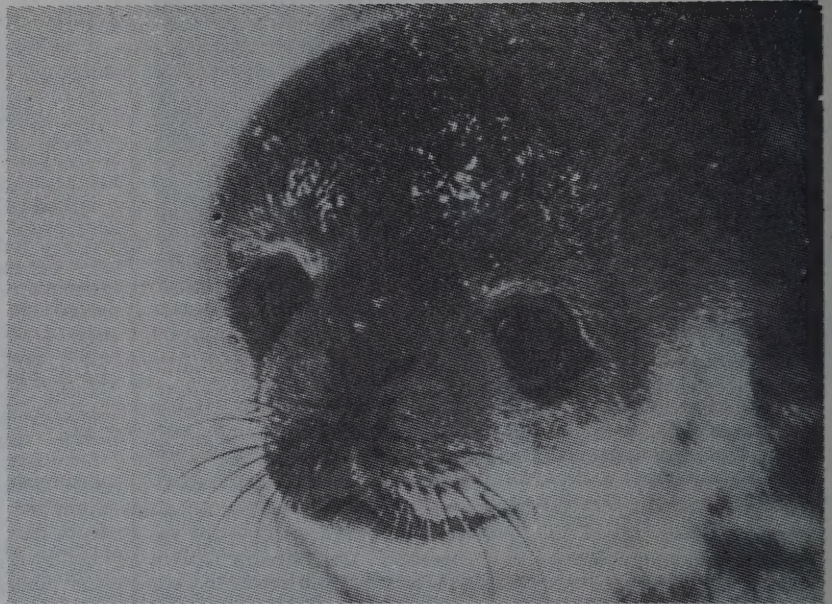
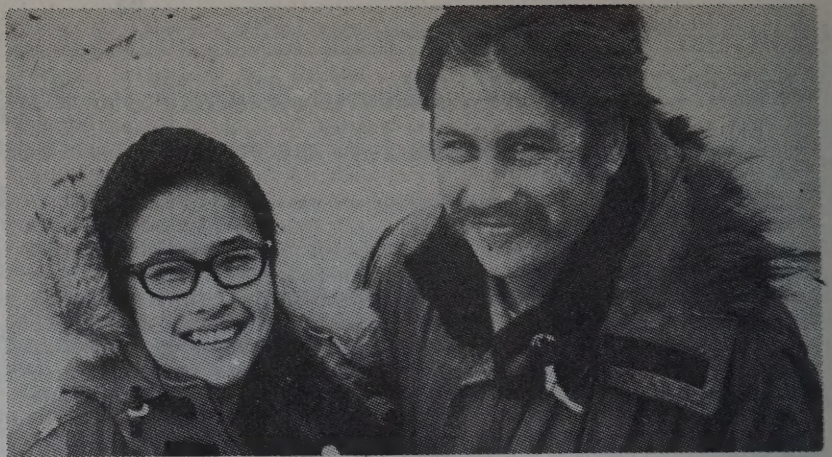
He is survived by his wife, son, and two daughters.

"Furba," said to be the world's oldest polar bear, died at the age of 35, the Frankfurt Zoo announced. She reached the greatest age of a polar bear ever known.



Photos by R. Norman Matheny, staff photographer

Iain Campbell (left) and Graeme Claridge prepare to camp out.



The Christian Science Monitor

Above: Arthur and Yuan DeVries combine research with married life. Below: Baby seal eyes photographer.



The ski-equipped Navy C-130 Hercules cargo plane

U. S. Navy Photo - by Gary Arnold